



(11)

EP 4 772 689 A1

(12)

EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:
08.07.2026 Bulletin 2026/28

(51) International Patent Classification (IPC):
D06F 58/26 ^(2006.01)

(21) Application number: **24858629.9**

(52) Cooperative Patent Classification (CPC):
D06F 58/20; D06F 58/26

(22) Date of filing: **28.08.2024**

(86) International application number:
PCT/CN2024/115208

(87) International publication number:
WO 2025/045096 (06.03.2025 Gazette 2025/10)

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

(72) Inventors:
• **LIU, Tong**
Nanjing, Jiangsu 210039 (CN)
• **HAN, Xianshan**
Nanjing, Jiangsu 210039 (CN)
• **HU, Chengbing**
Nanjing, Jiangsu 210039 (CN)
• **QI, Hang**
Nanjing, Jiangsu 210039 (CN)
• **WANG, Yongguang**
Nanjing, Jiangsu 210039 (CN)

(30) Priority: **31.08.2023 CN 202311136296**

(74) Representative: **Maiwald GmbH**
Elisenhof
Elisenstraße 3
80335 München (DE)

(71) Applicant: **Nanjing Roborock Innovation Technology Co., Ltd.**
Nanjing, Jiangsu 210039 (CN)

(54) **HEATING MODULE, DRYING MODULE, AND CLOTHES TREATMENT DEVICE**

(57) A heating unit (100), a drying assembly (10), and a clothing treatment apparatus are provided. The heating unit includes a housing (110), wherein the housing defines, in an enclosing manner, an accommodating space with an open end (115), the housing (110) is provided with a protruding portion (114), the protruding portion protrudes from a surface of the housing, and the protruding portion is configured to abut against and be assembled with an external element; and a heating component, the heating component comprising a heater (120), the heater (120) being disposed in the accommodating space..

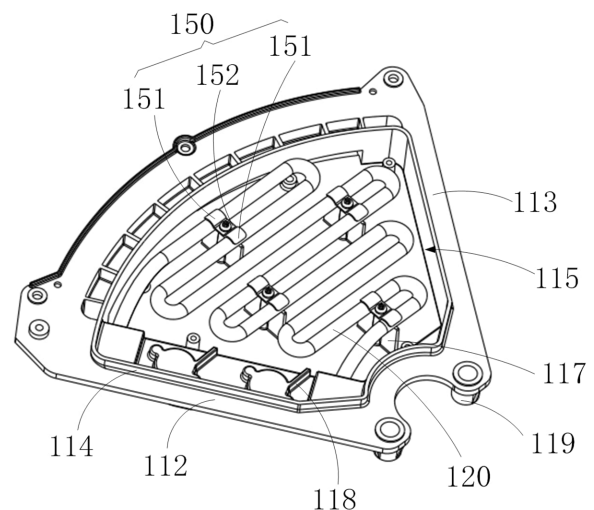


FIG. 11

Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present disclosure claims priority to Chinese Patent Application No. 202311136296.5 filed on August 31, 2023, the content of which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] The present disclosure relates to the technical field of household appliances, and in particular, to a heating unit, a drying assembly, and a clothing treatment apparatus.

BACKGROUND

[0003] With the improvement of living standards, many household appliances with a drying function have emerged for drying objects, which provides great convenience for people's lives. In household appliances using a dehumidification agent having a heating desorption performance, such as a molecular sieve, as a dehumidification unit, dry air, after passing through an object to be dried, carries away moisture from the object to be dried and becomes high-humidity air; the high-humidity air passes through the dehumidification unit, and after having its moisture adsorbed, becomes dry air again and is redelivered to the object to be dried for dehumidification; and the moisture in the dehumidification unit is removed by a heating unit, thereby forming a drying cycle.

[0004] However, the structure and assembly of the existing heating unit are relatively complex, and the cooperation between the heating unit and the dehumidification unit is also relatively complex.

[0005] It should be noted that the information disclosed in the above background section is only used for enhancement of understanding of the background of the present disclosure and therefore may include information that does not constitute the prior art known to those of ordinary skill in the art.

SUMMARY

[0006] An object of embodiments of the present disclosure is to provide a heating unit, a drying assembly, and a clothing treatment apparatus, which simplifies the structure and assembly of the entire heating unit.

[0007] According to one aspect of the embodiments of the present disclosure, a heating unit is provided. The heating unit includes:

a housing, where the housing defines, in an enclosing manner, an accommodating space with an open end, the housing is provided with a protruding portion, the protruding portion protrudes from a surface

of the housing, and the protruding portion is configured to abut against and be assembled with an external element; and

a heating component, the heating component including a heater, the heater being disposed in the accommodating space.

[0008] In one exemplary embodiment of the present disclosure, the housing is disposed such that at least a portion of thermal reflection thereof is directed toward the heater. In one exemplary embodiment of the present disclosure, the housing is further provided with a body portion, a side wall portion, and a mounting portion; the side wall portion and the body portion define, in an enclosing manner, the accommodating space, and the side wall portion is provided with an air inlet in communication with the open end; the mounting portion is connected to a side of the side wall portion away from the body portion and extends toward a periphery of the side wall portion; and the protruding portion is connected to the mounting portion and extends in a direction of the mounting portion away from the body portion.

[0009] In one exemplary embodiment of the present disclosure, the heating component further includes a temperature controller, and the temperature controller is disposed on at least one of the body portion, the side wall portion, and the mounting portion.

[0010] In one exemplary embodiment of the present disclosure, the housing is of an integrally formed structure.

[0011] In one exemplary embodiment of the present disclosure, the housing further includes:

a supporting member, the supporting member being disposed in the accommodating space, the supporting member and the body portion being of an integrally formed structure, and the supporting member being configured to support the heater.

[0012] In one exemplary embodiment of the present disclosure, the housing further includes:

a supporting member, the supporting member being disposed in the accommodating space, one end of the supporting member being connected to the body portion, and the other end of the supporting member supporting the heater; and the supporting member being made of a thermal insulation material.

[0013] In one exemplary embodiment of the present disclosure, the heating unit further includes:

a fixing sheet, the fixing sheet being located on a side of the heater away from the supporting member and connected to the supporting member, so as to fix the heater.

[0014] In one exemplary embodiment of the present disclosure, a blind hole is formed in at least one of the body portion, the side wall portion, and the mounting portion, and the temperature controller is disposed in the blind hole and close to the heater.

[0015] In one exemplary embodiment of the present disclosure, a thickness of a side wall of the blind hole is less than a thickness of the mounting portion.

[0016] In one exemplary embodiment of the present disclosure, a heat-conducting portion is disposed on an outer peripheral surface of a side wall of the blind hole, and the heat-conducting portion extends toward one side of the heater.

[0017] In one exemplary embodiment of the present disclosure, the heat-conducting portion is of an integrally formed structure on the housing, and is made of a same material as the side wall of the blind hole.

[0018] In one exemplary embodiment of the present disclosure, the housing is made of a high-alumina heat-resistant reflective substrate plate.

[0019] In one exemplary embodiment of the present disclosure, the heating unit further includes:

an air guide plate, the air guide plate being disposed between the heater and the body portion, and the air guide plate being spaced apart from the body portion; and the air guide plate being provided with a plurality of vent holes;

where the heater includes a plurality of heating tubes, and at least a portion of the vent holes are disposed opposite to the heating tubes.

[0020] According to another aspect of the embodiments of the present disclosure, a drying assembly is provided. The drying assembly includes:

a dehumidification unit, where the dehumidification unit includes a moisture adsorption-desorption member and a dehumidification housing, the dehumidification housing defines an accommodating space, and at least a portion of the moisture adsorption-desorption member is disposed in the accommodating space; and the dehumidification housing is provided with a vent, and the moisture adsorption-desorption member is configured to be able to adsorb moisture in gas entering the accommodating space;

the above heating unit, where the heating unit is fixed to the dehumidification housing, at least a portion of the moisture adsorption-desorption member is disposed opposite to the open end of the housing of the heating unit, and the heating unit is configured to dehydrate a portion of the moisture adsorption-desorption member located at the open end; and a sealing member, located between the mounting portion and the dehumidification housing and configured to seal a gap between the mounting portion and the dehumidification housing, the protruding portion abutting against the sealing member.

[0021] In one exemplary embodiment of the present disclosure, a heated air hole is further formed in the dehumidification housing, and the heating unit is fixed to the heated air hole of the dehumidification housing through the mounting portion; and at least a portion of the moisture adsorption-desorption member is disposed op-

posite to the open end of the housing of the heating unit through the heated air hole.

[0022] In one exemplary embodiment of the present disclosure, an air blocking portion is formed in the heated air hole of the dehumidification housing, the air blocking portion corresponds to an edge region of the moisture adsorption-desorption member, and the air blocking portion extends toward one side of a center of the moisture adsorption-desorption member.

[0023] In one exemplary embodiment of the present disclosure, a thermal insulation portion is formed at a position of the sealing member corresponding to the edge region of the moisture adsorption-desorption member, and the thermal insulation portion is located at an inner ring of the sealing member and extends toward one side of a center of the moisture adsorption-desorption member.

[0024] In one exemplary embodiment of the present disclosure, an outer peripheral surface of the sealing member is provided with a positioning portion, and the sealing member is limited relative to the housing of the heating unit through the positioning portion.

[0025] According to yet another aspect of the embodiments of the present disclosure, a clothing treatment apparatus is provided. The clothing treatment apparatus includes the above drying assembly.

[0026] According to the heating unit provided in the present disclosure, the heater is disposed in the accommodating space, and the housing includes a plurality of assembly regions for fixing the heater, such that there is no need to additionally provide various sealing structures to hold components. In addition, fewer holes are formed, which simplifies the structure and assembly of the entire heating unit, ensures the overall sealing performance of the heating unit, and can also simplify the sealing connection between the heating unit and the dehumidification unit through the protruding portion.

[0027] It should be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not construed as limiting the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] The drawings, which are incorporated into and constitute a part of the specification, illustrate embodiments consistent with the present disclosure and are used in conjunction with the specification to explain the principles of the present disclosure. Apparently, the drawings in the following description are merely some embodiments of the present disclosure, and those of ordinary skill in the art may still derive other drawings from these drawings without creative efforts. In the drawings:

FIG. 1 is a schematic view of a drying assembly, a clothing treatment drum, and a mounting plate according to one embodiment of the present disclo-

sure;

FIG. 2 is a schematic view of a drying assembly, a circulation assembly, and a condensation assembly according to one embodiment of the present disclosure;

FIG. 3 is an exploded view of a drying unit according to one embodiment of the present disclosure;

FIG. 4 is a schematic view of a dehumidification unit according to one embodiment of the present disclosure;

FIG. 5 is an exploded view of a dehumidification unit according to one embodiment of the present disclosure;

FIG. 6 is a schematic view of a heating unit according to one embodiment of the present disclosure;

FIG. 7 is an exploded view of a heating unit according to one embodiment of the present disclosure;

FIG. 8 is a schematic front view of a housing of a heating unit according to one embodiment of the present disclosure;

FIG. 9 is a schematic rear view of a housing of a heating unit according to one embodiment of the present disclosure;

FIG. 10 is a schematic front view of a heating unit according to one embodiment of the present disclosure;

FIG. 11 is a schematic rear view of a heating unit according to one embodiment of the present disclosure;

FIG. 12 is a schematic view of a heating unit provided with an air guide plate according to one embodiment of the present disclosure;

FIG. 13 is a schematic view of a sealing member according to one embodiment of the present disclosure;

FIG. 14 is a cross-sectional view of a drying assembly according to one embodiment of the present disclosure;

FIG. 15 is a partial cross-sectional view of a drying assembly according to one embodiment of the present disclosure;

FIG. 16 is a partial cross-sectional view of a drying assembly according to one embodiment of the present disclosure; and

FIG. 17 is an enlarged partial cross-sectional view of a drying assembly according to one embodiment of the present disclosure.

Reference numerals:

[0029]

10, drying assembly; 20, clothing treatment drum; 30, mounting plate; 40, circulation assembly; 50, condensation assembly;

100, heating unit; 110, housing; 111, body portion; 112, side wall portion; 113, mounting portion; 1131, notch; 1132, limiting strip; 1133, threaded mounting

portion; 1134, hollowed-out portion; 114, protruding portion; 115, open end; 116, blind hole; 117, supporting member; 1171, supporting portion; 1172, fixing portion; 118, heat-conducting portion; 119, screw hole base; 120, heater; 130, temperature controller; 140, air guide plate; 150, fixing sheet; 151, clamping portion; 152, connecting portion; 160, reinforcing rib; 170, regeneration fan;

200, dehumidification unit; 201, dehumidification housing; 210, first dehumidification housing; 220, second dehumidification housing; 230, heated air hole; 240, air blocking portion; 250, moisture adsorption-desorption member;

300, sealing member; 310, thermal insulation portion; 321, protrusion; 322, recess; 330, convex edge; and 340, limiting portion.

DETAILED DESCRIPTION

[0030] Exemplary embodiments will now be described more comprehensively with reference to the drawings. However, the exemplary embodiments may be implemented in various forms, and should not be understood as being limited to the examples described herein. On the contrary, these embodiments are provided to make the present disclosure more comprehensive and complete, and comprehensively convey the idea of the exemplary embodiments to those skilled in the art.

[0031] In addition, the described features, structures, or characteristics may be combined in one or more embodiments in any suitable manner. In the following description, many specific details are provided to give a full understanding of the embodiments of the present disclosure. However, those skilled in the art will appreciate that the technical solutions of the present disclosure may be practiced without one or more of the specific details, or other methods, components, devices, steps, and the like may be employed. In other cases, well-known methods, devices, implementations, or operations are not shown or described in detail to avoid obscuring aspects of the present disclosure. The block diagrams shown in the drawings are merely functional entities, which do not necessarily correspond to physically independent entities. That is, these functional entities may be implemented in the form of software, or in one or more hardware modules or integrated circuits, or across different networks and/or processor devices and/or micro-controller devices.

[0032] Although relative terms such as "upper" and "lower" are used in the specification to describe the relative relationship between one component and another component illustrated in the drawing, these terms are used in the specification for convenience only, for example, according to the directions of the examples described in the drawings. It can be understood that if the device illustrated in the drawing is turned upside down, the described "upper" component will become a "lower" component. When a structure is "on" another

structure, it may mean that the structure is integrally formed on the other structure, or that the structure is "directly" disposed on the other structure, or that the structure is "indirectly" disposed on the other structure through another structure.

[0033] The terms "a", "an", "the", and "at least one" are used to indicate the presence of one or more elements/components/etc.; the terms "include", "comprise", and "provided with" are used to indicate open-ended inclusion and mean that there may be additional elements/components/etc.; in addition to the listed elements/components/etc.; and the terms "first", "second", etc. are used only as labels, and are not intended to limit the number of objects thereof.

[0034] In one embodiment of the present disclosure, as shown in FIG. 1, a clothing treatment apparatus includes a drying assembly 10, a clothing treatment drum 20, and a mounting plate 30. The clothing treatment drum 20 is provided with an air inlet and an air outlet. An air outlet of the drying assembly 10 is in communication with the air inlet of the clothing treatment drum 20, and an air inlet of the drying assembly 10 is in communication with the air outlet of the clothing treatment drum 20, such that the drying assembly 10 continuously dehydrates gases in the clothing treatment drum 20, thereby drying the clothing in the clothing treatment drum 20.

[0035] In one embodiment, the drying assembly 10 is disposed above the clothing treatment drum 20 and corresponds to the mounting plate 30. The mounting plate 30 may be an upper housing of the clothing treatment apparatus. A thermal insulation layer may be disposed on a side of the mounting plate 30 facing the drying assembly 10. The thermal insulation layer is disposed such that thermal reflection thereof is directed toward the drying assembly 10. The thermal insulation layer may be made of thermal insulation foam or aluminum foil paper. The thermal insulation layer may be disposed corresponding to the drying assembly 10, so as to thermally insulate the mounting plate 30. The drying assembly 10 is connected to the mounting plate 30 and assembled in the clothing treatment apparatus through the mounting plate 30. The clothing treatment drum 20 may include a drum and an outer drum, or may be in the form of a washing machine without an outer drum, which is not limited in the present disclosure.

[0036] As shown in FIGS. 2 to 5, the drying assembly 10 includes a heating unit 100 and a dehumidification unit 200. An air outlet of the dehumidification unit 200 is in communication with the air inlet of the clothing treatment drum 20, and an air inlet of the dehumidification unit 200 is in communication with the air outlet of the clothing treatment drum 20, such that the dehumidification unit 200 continuously adsorbs moisture in the gas in the clothing treatment drum 20. The heating unit 100 can heat airflow and/or a moisture adsorption-desorption member 250, and the heated airflow passes through the moisture adsorption-desorption member 250 in the dehumidification unit 200 to dehumidify and dehydrate the moisture

adsorption-desorption member 250, such that the moisture adsorption-desorption member 250 regains the capacity to adsorb moisture. During the rotation of the moisture adsorption-desorption member 250, the moisture adsorption-desorption member passes through a dehumidification region of the dehumidification unit 200 and a dehydration region of the heating unit 100, enabling a continuous cyclic process of adsorbing and desorbing moisture, thereby drying the clothing in the clothing treatment drum 20. As shown in FIG. 5, the moisture adsorption-desorption member 250 may be a rotary disk, which allows it to pass through the dehumidification region of the dehumidification unit 200 and the dehydration region of the heating unit 100 by rotation.

[0037] In one embodiment, as shown in FIGS. 6 to 9, the heating unit 100 includes a housing 110 and a heating component. The housing 110 includes a protruding portion 114, the protruding portion protrudes from a surface of the housing 110, and the protruding portion 114 is configured to abut against and be assembled with an external element. The heating component includes a heater 120, and the heater 120 is disposed in an accommodating space.

[0038] In one embodiment, as shown in FIGS. 6 to 9, the heating unit 100 further includes a body portion 111, a side wall portion 112, and a mounting portion 113 that are formed into an integral structure. The protruding portion 114, the body portion 111, the side wall portion 112, and the mounting portion 113 may be of an integrally formed structure. The side wall portion 112 is located at an edge of the body portion 111 and extends toward one side of the body portion 111, the side wall portion 112 and the body portion 111 define, in an enclosing manner, an accommodating space with an open end 115, and the side wall is provided with an air inlet in communication with the open end 115. The mounting portion 113 is connected to a side of the side wall portion 112 away from the body portion 111 and extends toward a periphery of the side wall portion 112. The housing 110 is of an integrally formed component; and the protruding portion 114 is connected to the mounting portion 113 and extends in a direction of the mounting portion 113 away from the body portion 111.

[0039] In one embodiment, as shown in FIGS. 6 to 9, the heating component further includes a temperature controller 130, the heater 120 is connected to the temperature controller 130, and the temperature controller 130 is disposed on the body portion 111, or the side wall portion 112, or the mounting portion 113.

[0040] In one embodiment, as shown in FIGS. 6 to 9, the housing 110 is of an integrally formed structure; that is, the body portion 111, the side wall portion 112, the mounting portion 113, and the protruding portion 114 are formed into an integral structure. The housing 110 includes a plurality of mounting regions, and the plurality of mounting regions are mounted with at least one of the temperature controller 130, the heater 120, and a thermal insulation member and sealing member 300. The body

portion 111, the side wall portion 112, the mounting portion 113, and the protruding portion 114 of the housing 110 are formed into an integral structure, the heater 120 is disposed in the accommodating space, and the temperature controller 130 is disposed on at least one of the body portion 111, the side wall portion 112, and the mounting portion 113. The housing 110 includes a plurality of assembly regions for fixing the heater 120, the temperature controller 130, a thermal insulation member, and the like, such that there is no need to additionally provide various sealing structures to hold components. In addition, fewer holes are formed, which simplifies the structure and assembly of the entire heating unit 100, ensures the overall sealing performance of the heating unit 100, and can also simplify the sealing connection between the heating unit 100 and the dehumidification unit 200 through the protruding portion 114.

[0041] In one embodiment, as shown in FIGS. 8 and 9, the housing 110 of the heating unit 100 is substantially configured in a fan shape; that is, in a radial direction of the fan shape, an arc length of an end of the heating unit 100 close to a rotation center of the moisture adsorption-desorption member 250 is less than an arc length of an end thereof away from the rotation center of the moisture adsorption-desorption member 250.

[0042] In one embodiment, the body portion 111 located on a top surface is in a fan shape, the side wall portion 112 surrounds the body portion 111, and an air inlet of the heating unit 100 is formed in the side wall portion 112 located on an outer arc surface of the fan shape. Gas to be heated is delivered into the housing 110 through the air inlet. The gas is heated by the heater 120 in the housing 110, and then passes through the moisture adsorption-desorption member 250 to carry away the moisture from the moisture adsorption-desorption member 250, thereby achieving desorption of the moisture from the moisture adsorption-desorption member 250.

[0043] By allowing the housing 110 of the heating unit 100 to be in a fan shape, when the heating unit 100 cooperates with the dehumidification unit 200, for the circular moisture adsorption-desorption member 250, the heating unit 100 and the dehumidification unit 200 can cover the surface of the moisture adsorption-desorption member 250 as much as possible, such that most, or even all, portions of the moisture adsorption-desorption member 250 are separately located in the dehumidification region formed by the dehumidification unit 200 and the dehydration region formed by the heating unit 100, thereby relatively improving the drying capability for the clothing in the clothing treatment drum 20.

[0044] The housing 110 of the heating unit 100 is in a fan shape, and the air inlet of the heating unit 100 is formed in the side wall portion 112 located on the outer arc surface of the fan shape. When the direction in which the gas to be heated enters an accommodating chamber differs from the rotation direction of the moisture adsorption-desorption member 250, the heated gas has a higher flow velocity relative to the moisture adsorption-desorption member 250, thereby improving the desorption effect of the heated gas on the moisture in the moisture adsorption-desorption member 250.

ption member 250, thereby improving the desorption effect of the heated gas on the moisture in the moisture adsorption-desorption member 250.

[0045] In one embodiment, as shown in FIGS. 9 and 11, the housing 110 further includes a supporting member 117. The supporting member 117 is disposed in the accommodating space, the supporting member 117 and the body portion 111 are of an integrally formed structure, and the supporting member 117 is configured to support the heater 120. By enabling the supporting member 117 and the body portion 111 to be of an integrally formed structure, the integrally formed housing 110 is provided with the assembly region for the heater 120. This simplifies the structure and assembly of the heating unit 100 and avoids the formation of holes in the housing 110 to support and fix the heater 120, thereby further ensuring the sealing performance of the housing 110.

[0046] Certainly, the supporting member 117 and the housing 110 may also be of a split structure. The supporting member 117 is disposed in the accommodating space, one end of the supporting member 117 is connected to the body portion 111, and the other end of the supporting member supports the heater 120.

[0047] In one embodiment, the supporting member 117 is made of a thermal insulation material to prevent excessive heat from being conducted to the housing 110 and/or the moisture adsorption-desorption member 250, thereby preventing the housing 110 from overheating and/or preventing the local temperature of the moisture adsorption-desorption member 250 from being excessively high. The thermal insulation material is not limited in the present disclosure, as long as the supporting effect can be achieved at the same time.

[0048] In one embodiment, a blind hole 116 is formed in at least one of the body portion 111, the side wall portion 112, and the mounting portion 113, the temperature controller 130 is disposed in the blind hole 116, and the blind hole 116 may be recessed toward one side of the accommodating space and/or toward one side of the moisture adsorption-desorption member 250, such that the temperature controller 130 is disposed close to the heater 120. By forming the blind hole 116 recessed toward one side of the accommodating space in the body portion 111, or the side wall portion 112, or the mounting portion 113, the accommodation and assembly of the temperature controller 130 can be achieved, and independent arrangement of a separate fixing structure is avoided. The assembly region for the temperature controller 130 is directly formed on the integrally formed housing 110, which simplifies the structure and assembly of the heating unit 100, and avoids the formation of holes in the housing 110 to support and fix the temperature controller 130, thereby further ensuring the sealing performance of the housing 110. Certainly, the body portion 111 or the side wall portion 112 or the mounting portion 113 may also be provided with a through hole with the bottom penetrated, that is, the bottom of the blind hole is penetrated, which is not limited in the present disclosure.

[0049] As shown in FIG.s 8 to 10, two blind holes 116 are integrally formed in the mounting portion 113. The two blind holes 116 are each provided with one temperature controller 130, and the two temperature controllers 130 are separately connected to the heater 120.

[0050] The thickness of a side wall of the blind hole 116 is less than the thickness of the mounting portion 113. By allowing the thickness of the side wall of the blind hole 116 to be less than the thickness of the mounting portion 113, that is, thinning the side wall of the blind hole 116, the heat in the accommodating chamber can be better transferred into the blind hole 116, such that the temperature of the accommodating chamber obtained by the temperature controller 130 can be more accurate, and the temperature change of the accommodating space can be obtained more promptly. As a result, the control precision of the heating temperature of the heater 120 is improved, thereby finally improving the moisture desorption effect of the heated gas on the moisture adsorption-desorption member 250.

[0051] The diameter and depth of the blind hole 116 may be set based on the shape and size of the temperature controller 130, as long as the stabilizer can be assembled.

[0052] In one embodiment, as shown in FIG. 11, a heat-conducting portion 118 is disposed on an outer peripheral surface of the side wall of the blind hole 116, and the heat-conducting portion 118 extends toward one side of the heater 120. The blind hole 116 is located in the accommodating chamber, and heat in the accommodating chamber can be transferred to the temperature controller 130 through the side wall of the blind hole 116. By arranging the heat-conducting portion 118 on the outer peripheral surface of the side wall of the blind hole 116, the heat in the accommodating chamber can be transferred to the side wall of the blind hole 116 through the heat-conducting portion 118, thereby improving the heat transfer efficiency. In addition, the heat-conducting portion 118 enables uniform heat conduction, such that the temperature detected by the temperature controller 130 tends to be stable, thereby improving the accuracy of detection results and avoiding frequent fluctuations in the detected temperature caused by turbulence of the heated gas in the accommodating space.

[0053] The heat-conducting portion 118 is of a solid structure or a hollow structure; the heat-conducting portion 118 may be a structure integrally formed on the housing 110, that is, the heat-conducting portion and the side wall of the blind hole 116 may be made of the same material, such as aluminum alloy; and when the heat-conducting portion 118 and the side wall of the blind hole 116 are made of the same material, the heat transfer efficiency between the heat-conducting portion 118 and the side wall of the blind hole 116 can be ensured. Certainly, the heat-conducting portion 118 may be a structure separately connected to the side wall of the blind hole 116. The heat-conducting portion is connected to the side wall of the blind hole 116 by means of bonding,

welding, clamping, etc., to transfer heat, which is not limited in the present disclosure.

[0054] In one embodiment, the housing 110 is disposed such that at least a portion of thermal reflection thereof is directed toward the heater 120. By allowing the housing 110 to be disposed such that at least a portion of thermal reflection thereof is directed toward the heater 120, the heat generated by the heater 120 can be concentrated in the accommodating space. This raises the temperature of the accommodating space and further improves the heating effect on the gas. As a result, the moisture desorption effect on the moisture adsorption-desorption member 250 is improved, and finally, the drying effect of the drying assembly 10 on the clothing in the clothing treatment drum 20 is improved.

[0055] At least one of the body portion 111, the side wall portion 112, the mounting portion 113, and the protruding portion 114 of the housing 110 is disposed such that at least a portion of thermal reflection thereof is directed toward the heater 120. When the body portion 111, the side wall portion 112, the mounting portion 113, and the protruding portion 114 of the housing 110 are disposed such that the thermal reflection thereof is all directed toward the heater 120, the heat generated by the heater 120 can be concentrated in the accommodating space as much as possible. This further improves the heating effect on the gas, and thereby further improves the moisture desorption effect on the moisture adsorption-desorption member 250.

[0056] A thermal insulation layer may be disposed on an inner wall of the body portion 111, the side wall portion 112, the mounting portion 113, and the protruding portion 114 of the housing 110, and the thermal insulation layer is disposed such that thermal reflection thereof is directed toward the heater 120. The thermal insulation layer may be made of, for example, thermal insulation foam or aluminum foil paper.

[0057] The housing 110 may be made of, for example, a high-alumina heat-resistant reflective substrate plate. The high-alumina heat-resistant reflective substrate plate is used as the housing 110, such that the housing 110 has a thermal insulation effect when the thermal reflection thereof is directed toward the heater 120, thereby avoiding damage to other components caused by excessively high temperature of the surface of the housing 110. Certainly, the housing may also be made of other metal materials or non-metal materials, which is not limited in the present disclosure, and any change in the material of the housing falls within the protection scope of the present disclosure.

[0058] In one embodiment, as shown in FIG. 11, the heater 120 is composed of a plurality of heating tubes that are connected end to end. The heating tubes are distributed spaced apart in a radial direction of a fan shape, and the length of the heating tube is substantially perpendicular to the radial direction of the fan shape. The plurality of heating tubes, after being connected, are distributed in an S shape, and the length of the heating

tubes in the accommodating region is relatively larger. As a result, the area of contact with the gas to be heated can be increased, thereby achieving a relatively higher efficiency of heat exchange with the gas to be heated.

[0059] In the present disclosure, the heating tubes at both ends of the radial direction of the fan shape are narrowed, and the distance between the adjacent heating tubes is narrowed, such that the area occupied by the heating tubes can be relatively reduced. By narrowing the heating tubes at both ends of the radial direction of the fan shape and narrowing the distance between the adjacent heating tubes, the heat generated by the heating tubes is more concentrated, such that the temperature of the gas to be heated rises more quickly. In addition, the occupied volume of the heating tubes is reduced, such that the volume of the heating unit 100 can be reduced, thereby improving the integration degree of the drying assembly. An area of an orthographic projection of the heating tube on the body portion 111 is 20% to 60% of an area of the body portion 111, for example, 20%, 30%, 40%, 50%, or 60%, which will not be enumerated in the present disclosure.

[0060] In one embodiment, as shown in FIG. 9, one supporting member 117 is provided with two supporting portions 1171 and a fixing portion 1172 located between the two supporting portions 1171, and the two supporting portions 1171 each support one heating tube. A recess matched with an outer peripheral surface of the heating tube is formed in a supporting surface of the supporting portion 1171 and configured to limit the heating tube, so as to prevent the heating tube from moving left and right on the supporting surface or sliding off from the supporting surface. In addition, an area of contact between the supporting portion 1171 and the outer peripheral surface of the heating tube in the axial direction thereof is increased, and the supporting force of the supporting portion 1171 is distributed in a circumferential direction of the heating tube, thereby avoiding compression-induced deformation of the heating tube when a large fastening force is applied to the heating tube.

[0061] As shown in FIGS. 11 and 12, a fixing sheet 150 cooperates with the supporting member 117 to fix the heating tube. The fixing sheet 150 is located on the heating tube, and the heating tube is clamped and fixed through the fixing sheet 150 and the supporting portion 1171. The fixing sheet 150 includes two clamping portions 151 and a connecting portion 152 located between the two clamping portions 151. A mounting hole is formed in the fixing portion 1172 of the supporting member 117, and the connecting portion 152 of the fixing sheet 150 is fixedly connected to the supporting member 117 through a threaded member. After each heating tube is placed on the corresponding supporting portion 1171, the heating tube is fixed to the supporting portion 1171 through the clamping portions 151 of the fixing sheet 150. The connecting portion 152 of the fixing sheet 150 and the fixing portion 1172 of the supporting member 117 are detachably connected through the threaded member, which

facilitates the assembly, disassembly, and maintenance of the heating component.

[0062] In one embodiment, as shown in FIG. 12, the heating unit 100 further includes an air guide plate 140.

5 The air guide plate 140 is disposed between the heater 120 and the body portion 111, and the air guide plate 140 is spaced apart from the body portion 111. An airflow channel is formed between the air guide plate 140 and the body portion 111, and the airflow channel is in communication with the air inlet of the heating unit 100. After the gas to be heated enters the airflow channel formed between the air guide plate 140 and the body portion 111, the gas to be heated flows through the plurality of heating tubes in the heater 120 under the guiding function of the air guide plate 140. The air guide plate 140 is provided with a plurality of vent holes, and at least a portion of the vent holes are disposed opposite to the heating tubes. The air guide plate 140 allows the gas to be heated to enter the heater 120 more uniformly for heating.

10 **[0063]** A plurality of air holes may be arranged in rows in the radial direction of the fan shape, the arrangement position of each row of the air holes substantially corresponds to the position of the heating tube, and the diameters of the air holes gradually increase from an outer arc to a center of a circle in the radial direction of the fan shape. The air inlet of the heating unit 100 is located on a side surface of the outer arc of the housing 110, the diameter of the air hole close to the air inlet is relatively small, and the diameter of the air hole away from the air inlet is relatively large; that is, the diameter of the air hole close to the air inlet is less than the diameter of the air hole far from the air inlet. This ensures substantially the same gas flow rate of each air hole and allows the gas to be heated to enter the heater 120 more uniformly for heating.

15 **[0064]** In one embodiment, when the heating unit 100 further includes the air guide plate 140, the supporting member 117 may be disposed on the air guide plate 140. The supporting member 117 and the air guide plate 140 may be of an integrally formed structure, or may be of a split structure; that is, one end of the supporting member 117 is connected to the body portion 111, and the other end of the supporting member supports the heater 120.

20 **[0065]** In one embodiment, as shown in FIGS. 1 and 2, the drying assembly 10 is further connected to a circulation assembly 40. The circulation assembly 40 includes a blower, an air inlet of the blower is in communication with the air outlet of the clothing treatment drum 20, and an air outlet of the blower is in communication with the air inlet of the dehumidification unit 200, so as to deliver gas to be dehumidified from the clothing treatment drum 20 into the dehumidification unit 200. The gas to be dehumidified is treated by the dehumidification unit 200 and becomes dry gas, such that the wet circulating gas is changed into the dry circulating gas. The dry gas enters the clothing treatment drum 20 through the air inlet of the clothing treatment drum 20 to be in contact with the clothing, thereby achieving cyclic dehumidification for the clothing in the clothing treatment drum 20.

[0066] In one embodiment, as shown in FIGS. 1 and 2, the drying assembly 10 is further connected to a condensation assembly 50. The condensation assembly 50 can condense and dehydrate the hot and humid gas after moisture desorption by the moisture adsorption-desorption member 250. The water vapor of the hot and humid gas is cooled to form condensed water, which is discharged by a condenser, and becomes dry and cold gas to be heated. The dry and cold gas to be heated enters a regeneration fan 170 of the heating unit 100, such that the gas forms a closed cycle. Certainly, the dry and cold gas to be heated formed after the treatment of the condenser may also be directly discharged into the atmosphere, which is not limited in the present disclosure. The condensation assembly 50 may include a tubular condenser. The hot and humid gas is cooled by the tubular condenser, such that the water vapor of the hot and humid gas is cooled to form condensed water, which is discharged by the condenser. The specific composition of the condensation assembly is not limited in the present disclosure.

[0067] The gas in the heating unit 100 delivered by the regeneration fan 170 may be the dry and cold gas after the moisture desorption by the moisture adsorption-desorption member 250; that is, the gas is recycled. The humidity of the delivered gas is relatively low, which can improve the drying efficiency and reduce energy consumption. Alternatively, the regeneration fan 170 of the heating unit 100 may directly suck in gas from the outside.

[0068] In one embodiment, as shown in FIG.s 3 to 5 and FIGS. 14 to 16, the dehumidification unit 200 includes a moisture adsorption-desorption member 250 and a dehumidification housing 201. The dehumidification housing 201 defines an accommodating space, and at least a portion of the moisture adsorption-desorption member 250 is located in the accommodating space. The dehumidification housing 201 is provided with a vent, and the moisture adsorption-desorption member 250 is configured to be able to adsorb moisture in the gas entering the accommodating space. The heating unit 100 is fixed to the first dehumidification housing 210 through the mounting portion 113, at least a portion of the moisture adsorption-desorption member 250 is disposed opposite to the open end 115 of the housing 110, and the heating unit 100 is configured to dehydrate the portion of the moisture adsorption-desorption member 250 located at the open end 115. The sealing member 300 is located between the mounting portion 113 and the first dehumidification housing 210 and configured to seal a gap between the mounting portion 113 and the first dehumidification housing 210. The protruding portion 114 abuts against the sealing member 300, and the protruding portion 114 serves as a sealing portion between the housing 110 and the sealing member 300. According to the present disclosure, the protruding portion 114 is formed on the housing 110 of an integrally formed structure. When the heating unit 100 is assembled on the dehumidification unit 200, the protruding portion 114

cooperates with the sealing member 300, so as to limit the sealing member 300 between the heating unit 100 and the dehumidification unit 200, thereby ensuring the sealing effect of the sealing member 300.

[0069] In one embodiment, as shown in FIG. 4, a heated air hole 230 is formed in the dehumidification housing 201. The heating unit 100 dehydrates the portion of the moisture adsorption-desorption member 250 located at the open end 115 through the heated air hole 230.

[0070] In one embodiment, as shown in FIG. 5, the dehumidification housing 201 includes a first dehumidification housing 210 and a second dehumidification housing 220. The first dehumidification housing 210 and the second dehumidification housing 220 define, in an enclosing manner, the accommodating space, and at least a portion of the moisture adsorption-desorption member 250 is located in the accommodating space. The first dehumidification housing 210 and the second dehumidification housing 220 are each provided with a vent, and the moisture adsorption-desorption member 250 is configured to be able to adsorb the moisture in the gas entering the accommodating space. The heated air hole 230 is formed in the first dehumidification housing 210.

[0071] In one embodiment, as shown in FIG. 2, the fan-shaped heating unit 100 and the heated air hole 230 are formed on the first dehumidification housing 210, the heating unit 100 is mounted on the heated air hole 230, and the heating unit 100 is located above the moisture adsorption-desorption member 250.

[0072] In one embodiment, as shown in FIGS. 8 to 12, a screw hole base 119 is formed on the housing 110 of the heating unit 100. When the housing 110 is integrally formed, the screw hole base 119 can be synchronously formed to serve as the assembly region for fixedly connecting the heating unit 100 and the dehumidification unit 200, such that the heating unit 100 and the dehumidification unit 200 can be directly connected together through the threaded member, without the need to provide other screw fastening structures on the housing 110 of the heating unit 100.

[0073] The size and number of the screw hole base 119 and the distribution thereof on the housing 110 may be set according to the specific structures of the heating unit 100 and the dehumidification unit 200, which is not limited in the present disclosure.

[0074] In one embodiment, as shown in FIG. 17, a sealing structure with a Y-shaped cross-section is formed on a side of the sealing member 300 facing the mounting portion 113 of the housing 110. When the mounting portion 113 is in close contact with the sealing member 300, the Y-shaped sealing structure on the sealing member 300 can be pressed and expanded by the pressing force exerted by the mounting portion 113, thereby avoiding gap formation between the sealing member 300 and the mounting portion 113 and improving the sealing effect between the sealing member 300 and the mounting

portion 113. Certainly, the cross-section of the sealing structure may also be of a rectangular shape, a triangular shape, an irregular shape, or the like, which is not limited in the present disclosure.

[0075] In one embodiment, as shown in FIG. 17, a sealing protrusion may be disposed on a sealing surface of the first dehumidification housing 10 of the dehumidification unit 200 abutting against the sealing member 300. The sealing protrusion presses against the sealing member 300, so as to improve the sealing effect with the sealing member 300. The cross-sectional shape of the sealing protrusion may be triangular, semicircular, rectangular, irregular, or the like, which is not limited in the present disclosure.

[0076] Those skilled in the art may also provide the sealing structure on the mounting portion 113 of the housing 110, provide other sealing structures on the dehumidification housing 201, or provide other sealing structures on the upper and lower sealing surfaces of the sealing member 300, which is not limited in the present disclosure.

[0077] In one embodiment, as shown in FIG. 13, the sealing member 300 is provided with a limiting portion 340 matched with the screw hole base 119 on the housing 110, and a limiting hole is formed in the limiting portion 340. The screw hole base 119 is of a cylindrical structure, and the limiting portion 340 of the sealing member 300 may be fitted over the screw hole base 119 of a cylindrical structure through the limiting hole, so as to position the sealing member 300 relative to the housing, thereby improving the sealing effect of the sealing member 300.

[0078] The size and number of the limiting portion 340 and the distribution thereof on the sealing member 300 match the size and number of the screw hole base 119 and the distribution thereof on the housing 110, which is not limited in the present disclosure.

[0079] A first gas flow channel is formed between the first dehumidification housing 210 and the moisture adsorption-desorption member 250, and a second gas flow channel is formed between the second dehumidification housing 220 and the moisture adsorption-desorption member 250. The first gas flow channel and the second gas flow channel form the dehumidification region of the moisture adsorption-desorption member 250. The humid gas in the clothing treatment drum 20 can enter the first gas flow channel, undergoes moisture adsorption by the moisture adsorption-desorption member 250, and then is discharged through the second gas flow channel; or, the humid gas in the clothing treatment drum 20 can enter the second gas flow channel, undergoes moisture adsorption by the moisture adsorption-desorption member 250, and then is discharged through the first gas flow channel.

[0080] The open end 115 of the heating unit 100 is in communication with the hot air hole in the first dehumidification housing 210; that is, a third gas flow channel is formed between the heater 120 and the moisture adsorption-desorption member 250. A fourth gas flow channel is formed between the second dehumidification housing

220 and the moisture adsorption-desorption member 250, and the fourth gas flow channel of the second dehumidification housing 220 is separated from the second gas flow channel by a barrier member, so as to enable the dehumidification region to be separated from the dehydration region. The heated high-temperature dry gas enters the third gas flow channel to perform moisture desorption on the moisture adsorption-desorption member 250. The humid gas passing through the moisture adsorption-desorption member 250 enters the fourth gas flow channel. During the rotation of the moisture adsorption-desorption member 250, each portion thereof in a circumferential direction continuously passes through the dehumidification region and the dehydration region, thereby enabling a continuous cyclic process of adsorbing and desorbing moisture, and finally drying the clothing in the clothing treatment drum 20.

[0081] The dehumidification region and the dehydration region are relatively isolated, such that the dehumidification gas flow in the first gas flow channel and the second gas flow channel, and the dehydration gas flow in the third gas flow channel and the fourth gas flow channel are not in communication with each other, thereby ensuring the dehydration effect on the humid gas.

[0082] The moisture adsorption-desorption member 250 may be made of a material with good moisture adsorbing performance, so as to improve the moisture adsorption capacity for the humid gas, thereby improving the drying effect on the clothing in the clothing treatment drum 20. The material of the moisture adsorption-desorption member includes, for example, lithium chloride, silica gel, zeolite, or a molecular sieve, which is not limited in the present disclosure.

[0083] In one embodiment, the moisture adsorption-desorption member 250 is provided with a moisture adsorption agent for adsorbing moisture. The moisture adsorption agent may be, for example, zeolite, modified/synthetic zeolite, a molecular sieve (including but not limited to a zeolite molecular sieve, an A/X/Y-type molecular sieve, a ZSM molecular sieve, a Beta molecular sieve, etc.), a polymeric moisture adsorption agent, alkali metal aluminosilicate (a 13X molecular sieve), lithium chloride, silica gel, modified silica gel, activated aluminum oxide, and other materials with moisture adsorbing performance. The polymeric moisture adsorption agent is also referred to as a polymer adsorbent, which has a lower regeneration temperature than conventional adsorbents such as silica gel, activated carbon, or a molecular sieve.

[0084] In one embodiment, the moisture adsorption-desorption member 250 may be made of porous materials such as zeolite, molecular sieves, metal organic frameworks (metal organic frameworks, MOFs), covalent organic frameworks (COFs), nano-carbon, and silicon dioxide. In one embodiment, the moisture adsorption-desorption member 250 may also be formed by filling with granular solids or particles made of at least one of the above porous materials.

[0085] In one embodiment, the moisture adsorption-desorption member 250 may be a honeycomb-shaped or corrugated moisture adsorption-desorption member carrying a moisture adsorption agent, which can adsorb and desorb the adsorbed water vapor for repeated desorption and regeneration.

[0086] In one embodiment, the moisture adsorption-desorption member 250 includes an inorganic/organic fiber substrate (e.g., ceramic, glass fiber, MOFs, COFs, or cordierite). The fiber substrate is coated with a moisture adsorption agent such as a molecular sieve. The molecular sieve is uniformly distributed between the fiber substrates and on the surface of the fiber substrates, so as to adsorb moisture from the airflow. The molecular sieve may include a single crystal molecular sieve such as an A-type molecular sieve, an X/Y-type molecular sieve, a ZSM molecular sieve, or a Beta molecular sieve, or a mixed crystal molecular sieve.

[0087] The present disclosure does not limit the specific material of the moisture adsorption-desorption member 250, and any moisture adsorption-desorption member that can achieve the moisture adsorption-desorption effect falls within the protection scope of the present disclosure.

[0088] In one embodiment, an outer peripheral surface of the sealing member 300 is provided with a positioning portion, and the sealing member 300 is limited relative to the first dehumidification housing 210 through the positioning portion. By providing the outer peripheral surface of the sealing member 300 with the positioning portion, when the sealing member 300 is assembled, the sealing member 300 is limited relative to the first dehumidification housing 210 through the positioning portion, such that the assembly of the sealing member 300 is limited. In addition, the sealing effect of the sealing member 300 can be ensured, and the first dehumidification housing 210 can be prevented from overheating and melting. The sealing member 300 may be a rubber sealing member. The rubber sealing member features a simple molding process, a low cost, and a long service life.

[0089] The shape of the sealing member 300 matches the shape of the mounting portion 113; that is, the sealing member 300 is also in a fan shape. The positioning portion may be a protrusion and a recess formed on an outer arc surface of the fan-shaped sealing member 300 in a radial direction. As shown in FIG. 9, a notch 1131 is formed in the side edge of the outer arc of the housing 110 of the heating unit 100, and a protruding threaded mounting portion 1133 is in the notch 1131. The protrusion 321 on the outer arc surface of the sealing member 300 matches the notch 1131 in the housing 110, and the recess 322 in the outer arc surface matches the protruding threaded mounting portion 1133, thereby achieving the assembly and limiting of the sealing member 300 and the housing 110 of the heating unit 100.

[0090] In one embodiment, as shown in FIG. 9, a limiting strip 1132 is formed on the side edge of the outer arc of the housing 110 of the heating unit 100. As shown in FIG.

13, an arc-shaped convex edge 330 is formed on a side edge of an outer arc of the sealing member 300, and the convex edge 330 is matched with the limiting strip 1132. After the sealing member 300 is located between the heating unit 100 and the dehumidification unit 200, the convex edge 330 abuts against the limiting strip 1132 in the radial direction of the fan shape, thereby achieving a positioning effect between the sealing member 300 and the housing 110 and improving the sealing effect of the sealing member 300.

[0091] In one embodiment, as shown in FIG. 13, a thermal insulation portion 310 is formed at a position of the sealing member 300 corresponding to an edge region of the moisture adsorption-desorption member 250, and the thermal insulation portion 310 is located at an inner ring of the sealing member 300 and extends toward one side of a center of the moisture adsorption-desorption member 250. The sealing member 300 is also in a fan shape, and a portion extending toward the inside of the sealing member 300 is formed on the portion of the sealing member 300 located on one side of the outer arc in the radial direction. Since the portion is located between the heating region and the moisture adsorption-desorption member 250, the extended portion forms a barrier to the heated gas, such that the air volume of heated gas in the heated air hole 230 close to the edge region of the moisture adsorption-desorption member 250 is reduced, thereby relatively lowering the temperature of the edge region when the moisture adsorption-desorption member 250 is located in the dehydration region. This prevents elements, such as the housing or a plastic gear of the moisture adsorption-desorption member 250, in the edge region of the moisture adsorption-desorption member 250 from overheating. In one embodiment, when the edge of the moisture adsorption-desorption member 250 is provided with the plastic gear, through the design of the extended portion, the reliability of teeth of the plastic gear disposed at the edge of the moisture adsorption-desorption member 250 can be ensured, and the deformation or even melting of the teeth of the plastic gear caused by high temperature are avoided, thereby improving the reliability of the drying assembly.

[0092] When the heating unit 100 is in sealing connection with the dehumidification unit 200, the portion, located on the outer arc, of the protruding portion 114 on the housing 110 of the heating unit 100 may abut against the thermal insulation portion 310 of the sealing member 300, that is, abutting against the extended portion of the sealing member 300.

[0093] In one embodiment, as shown in FIG. 4, an air blocking portion 240 is formed in the heated air hole 230 of the first dehumidification housing 210. The air blocking portion 240 corresponds to the edge region of the moisture adsorption-desorption member 250, and the air blocking portion 240 extends toward one side of the center of the moisture adsorption-desorption member 250. The heated air hole 230 in the first dehumidification housing 210 is in a fan shape, and a portion extending

toward one side of a center of the first dehumidification housing 210 is formed on a portion of the first dehumidification housing 210 located on one side of the outer arc in the radial direction, and the extended portion serves as the air blocking portion 240. Since this portion is located between the heating region and the moisture adsorption-desorption member 250, the extended air blocking portion 240 forms a barrier against the heated gas, such that the air volume of the heated gas in the heated air hole 230 close to the edge region of the moisture adsorption-desorption member 250 is reduced, thereby relatively lowering the temperature of the edge region when the moisture adsorption-desorption member 250 is located in the dehydration region. This helps prevent the elements, such as the housing or the plastic gear of the moisture adsorption-desorption member 250, in the edge region of the moisture adsorption-desorption member 250 from overheating. In one embodiment, when the edge of the moisture adsorption-desorption member 250 is provided with the plastic gear, through the design of the extended air blocking portion 240, the reliability of teeth of the plastic gear disposed at the edge of the moisture adsorption-desorption member 250 can be ensured, and the deformation or even melting of the teeth of the plastic gear caused by high temperature are avoided, thereby improving the reliability of the drying assembly.

[0094] In addition, the thermal insulation portion 310 on the sealing member 300 is disposed opposite to the air blocking portion 240 on the first dehumidification housing 210. The thermal insulation portion 310 and the air blocking portion 240 form a dual barrier against the high-temperature gas, which can further lower the temperature of the edge region when the moisture adsorption-desorption member 250 is located in the dehydration region, thereby further ensuring the reliability of the teeth of the plastic gear disposed at the edge of the moisture adsorption-desorption member 250.

[0095] In one embodiment, as shown in FIGS. 7 and 8, a reinforcing rib 160 is disposed between the side wall portion 112 and the mounting portion 113 of the housing 110. The reinforcing rib 160 enhances the structural strength of the housing 110.

[0096] The reinforcing rib 160 may be located between the mounting portion 113 provided with the blind hole 116 and the side wall portion 112. Since the mounting portion 113 is provided with the blind hole 116, after the temperature controller 130 is assembled, a higher requirement is imposed on the structure of the mounting portion 113 of the blind hole 116, to avoid the fracture of the housing 110 due to the assembly of the temperature controller 130. Therefore, by adding the reinforcing rib 160 between the mounting portion 113 provided with the blind hole 116 and the side wall portion 112, the structural strength between the mounting portion 113 provided with the blind hole 116 and the side wall portion 112 is enhanced, thereby improving the reliability of the housing 110.

[0097] A plurality of reinforcing ribs 160 may be pro-

vided and distributed between the mounting portion 113 provided with the blind hole 116 and the side wall portion 112, or distributed between the mounting portion 113 provided with the blind hole 116 or not provided with the blind hole 116 and the side wall portion 112. The number and distribution position of the reinforcing rib 160 are not limited in the present disclosure.

[0098] The reinforcing rib 160 may be of a sheet-like triangular structure, such that the reinforcing rib 160 is directly formed when the housing 110 is integrally formed, thereby further improving the effect of the reinforcing rib 160 on enhancing the structural strength. Certainly, the reinforcing rib may also be in other shapes, and the reinforcing rib may also be connected to the housing 110 by means of bonding, clamping, welding, etc., which is not limited in the present disclosure.

[0099] In one embodiment, as shown in FIG. 9, on the fan-shaped housing 110, a plurality of hollowed-out portions 1134 arranged in rows are formed on the mounting portion 113 close to the periphery in the radial direction, and the hollowed-out portions 1134 are located on a side of the mounting portion 113 close to the protruding portion 114. By providing the hollowed-out portion 1134, when the housing 110 is formed, the wall thickness of the housing structure can be adjusted to enable a uniform wall thickness, such that the housing 110 may be formed through an integral molding process. In addition, by providing the plurality of hollowed-out portions 1134 on the housing 110, the side walls between the plurality of hollowed-out portions 1134 form supporting ribs, thereby increasing the structural strength of the housing 110.

[0100] The drying assembly provided in the present disclosure may be applied to the clothing treatment apparatus, and the clothing treatment apparatus may be, for example, an integrated washer-dryer machine. Certainly, the drying assembly provided in the present disclosure may also be applied to household appliances requiring moisture adsorption/drying, such as refrigerators, air conditioners, and dishwashers.

[0101] Other embodiments of the present disclosure are apparent to those skilled in the art from consideration of the specification and practice of the present disclosure disclosed herein. The present disclosure is intended to cover any variations, uses, or adaptations of the present disclosure following the general principles of the present disclosure and including known common knowledge or customary technical means undisclosed in the art of the present disclosure. The specification and embodiments are only considered exemplary, and the true scope and spirit of the present disclosure are indicated in the claims below.

[0102] It should be appreciated that the present disclosure is not limited to the exact construction that has been described above and illustrated in the drawings, and that various modifications and changes can be made without departing from the scope thereof. The scope of the present disclosure is limited only by the appended claims.

Claims**1.** A heating unit, comprising:

a housing, wherein the housing defines, in an enclosing manner, an accommodating space with an open end, the housing is provided with a protruding portion, the protruding portion protrudes from a surface of the housing, and the protruding portion is configured to abut against and be assembled with an external element; and a heating component, the heating component comprising a heater, the heater being disposed in the accommodating space.

2. The heating unit according to claim 1, wherein the housing is disposed such that at least a portion of thermal reflection thereof is directed toward the heater.**3.** The heating unit according to claim 1 or 2, wherein the housing is further provided with a body portion, a side wall portion, and a mounting portion; the side wall portion and the body portion define, in an enclosing manner, the accommodating space, and the side wall portion is provided with an air inlet in communication with the open end; the mounting portion is connected to a side of the side wall portion away from the body portion and extends toward a periphery of the side wall portion; and the protruding portion is connected to the mounting portion and extends in a direction of the mounting portion away from the body portion.**4.** The heating unit according to claim 3, wherein the heating component further comprises a temperature controller, and the temperature controller is disposed on at least one of the body portion, the side wall portion, and the mounting portion.**5.** The heating unit according to any one of the preceding claims, wherein the housing is of an integrally formed structure.**6.** The heating unit according to claim 3, wherein the housing further comprises:
a supporting member, the supporting member being disposed in the accommodating space, the supporting member and the body portion being of an integrally formed structure, and the supporting member being configured to support the heater.**7.** The heating unit according to claim 3, wherein the housing further comprises:
a supporting member, the supporting member being disposed in the accommodating space, one end of the supporting member being connected to the body portion, and the other end of the supporting member

supporting the heater; and the supporting member being made of a thermal insulation material.

8. The heating unit according to claim 7, wherein the heating unit further comprises:
a fixing sheet, the fixing sheet being located on a side of the heater away from the supporting member and connected to the supporting member, so as to fix the heater.**9.** The heating unit according to claim 4, wherein a blind hole is formed in at least one of the body portion, the side wall portion, and the mounting portion, and the temperature controller is disposed in the blind hole and close to the heater.**10.** The heating unit according to claim 9, wherein a thickness of a side wall of the blind hole is less than a thickness of the mounting portion.**11.** The heating unit according to claim 9, wherein a heat-conducting portion is disposed on an outer peripheral surface of a side wall of the blind hole, and the heat-conducting portion extends toward one side of the heater.**12.** The heating unit according to claim 11, wherein the heat-conducting portion is of an integrally formed structure on the housing, and is made of a same material as the side wall of the blind hole.**13.** The heating unit according to any one of the preceding claims, wherein the housing is made of a high-alumina heat-resistant reflective substrate plate.**14.** The heating unit according to claim 3, further comprising:

an air guide plate, the air guide plate being disposed between the heater and the body portion, and the air guide plate being spaced apart from the body portion; and the air guide plate being provided with a plurality of vent holes; wherein the heater includes a plurality of heating tubes, and at least a portion of the vent holes are disposed opposite to the heating tubes.

15. A drying assembly, comprising:

a dehumidification unit, wherein the dehumidification unit comprises a moisture adsorption-desorption member and a dehumidification housing, the dehumidification housing defines an accommodating space, and at least a portion of the moisture adsorption-desorption member is disposed in the accommodating space; and the dehumidification housing is provided with a vent, and the moisture adsorption-desorption

member is configured to be able to adsorb moisture in gas entering the accommodating space;

the heating unit according to any one of claims 1 to 14, wherein the heating unit is fixed to the dehumidification housing, at least a portion of the moisture adsorption-desorption member is disposed opposite to the open end of the housing of the heating unit, and the heating unit is configured to dehydrate a portion of the moisture adsorption-desorption member located at the open end; and

a sealing member, located between the mounting portion and the dehumidification housing and configured to seal a gap between the mounting portion and the dehumidification housing, the protruding portion abutting against the sealing member.

16. The drying assembly according to claim 15, wherein a heated air hole is further formed in the dehumidification housing, and the heating unit is fixed to the heated air hole of the dehumidification housing through the mounting portion; and at least a portion of the moisture adsorption-desorption member is disposed opposite to the open end of the housing of the heating unit through the heated air hole.

17. The drying assembly according to claim 16, wherein an air blocking portion is formed in the heated air hole of the dehumidification housing, the air blocking portion corresponds to an edge region of the moisture adsorption-desorption member, and the air blocking portion extends toward one side of a center of the moisture adsorption-desorption member.

18. The drying assembly according to claim 15, wherein a thermal insulation portion is formed at a position of the sealing member corresponding to the edge region of the moisture adsorption-desorption member, and the thermal insulation portion is located at an inner ring of the sealing member and extends toward one side of a center of the moisture adsorption-desorption member.

19. The drying assembly according to claim 15, wherein a positioning portion is disposed at an outer peripheral surface of the sealing member, and the sealing member is limited relative to the housing of the heating unit through the positioning portion.

20. A clothing treatment apparatus, comprising the drying assembly according to any one of claims 15 to 19.

55

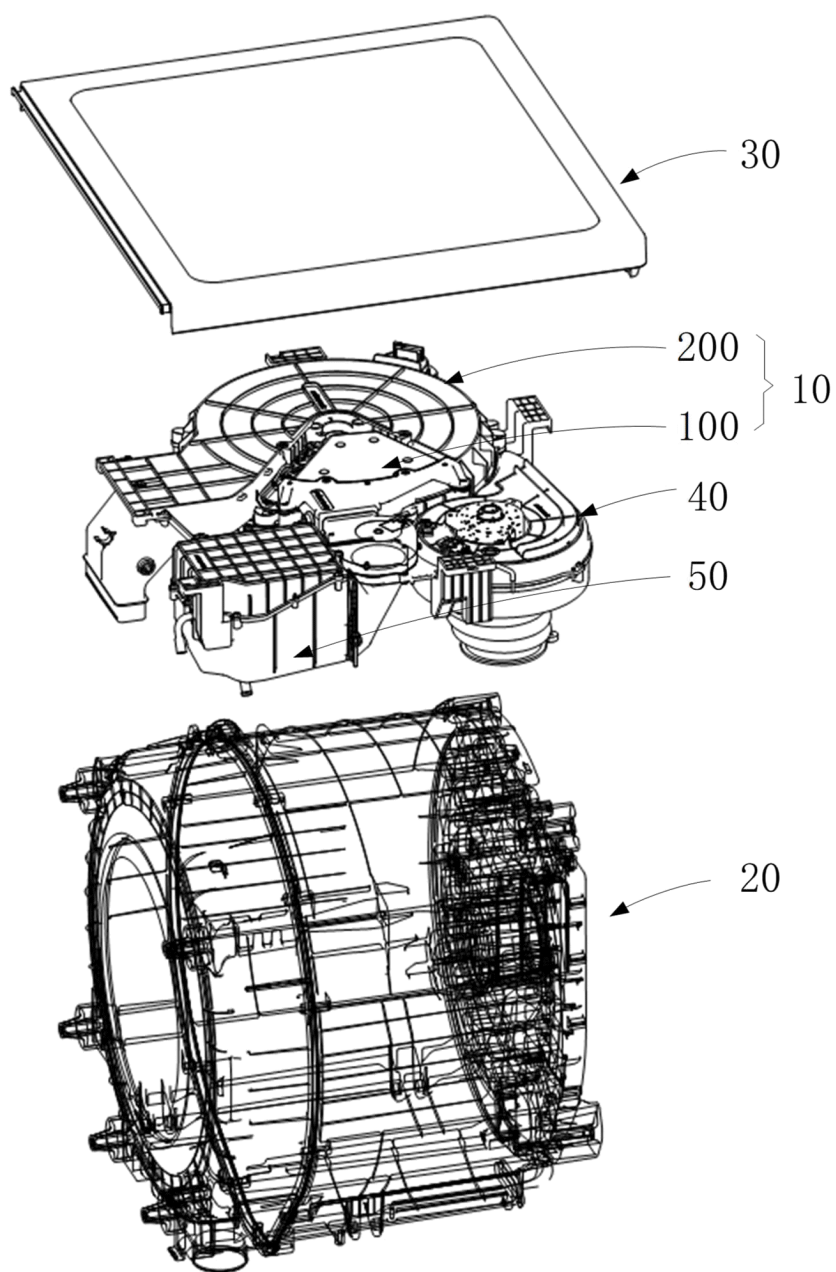


FIG. 1

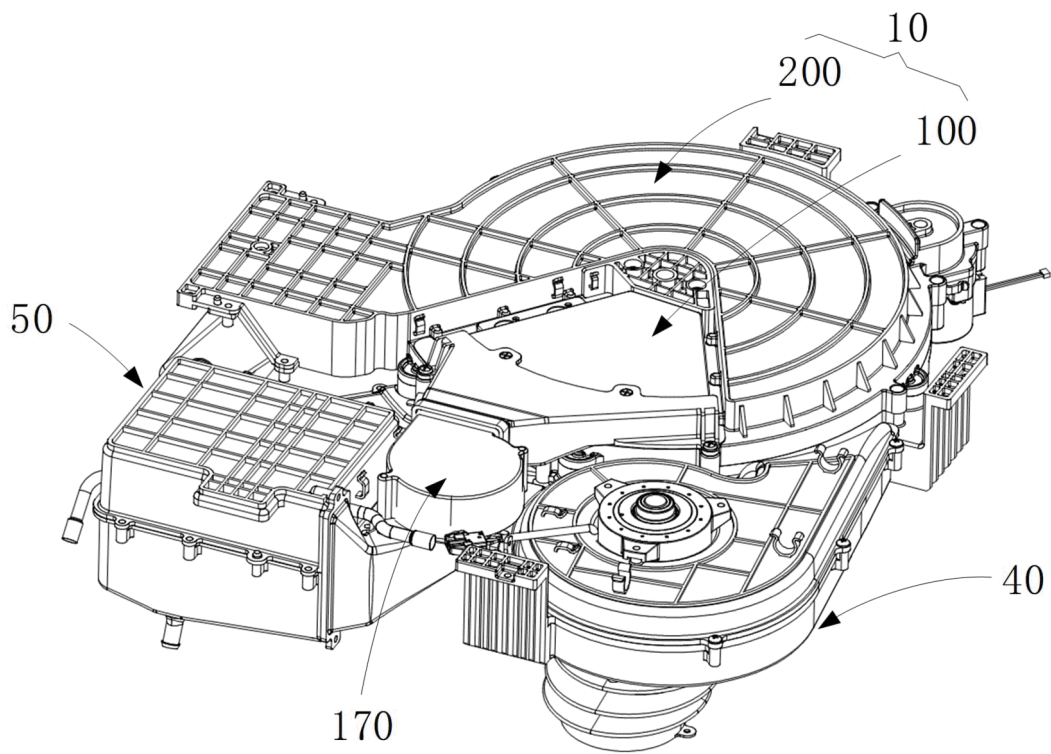


FIG. 2

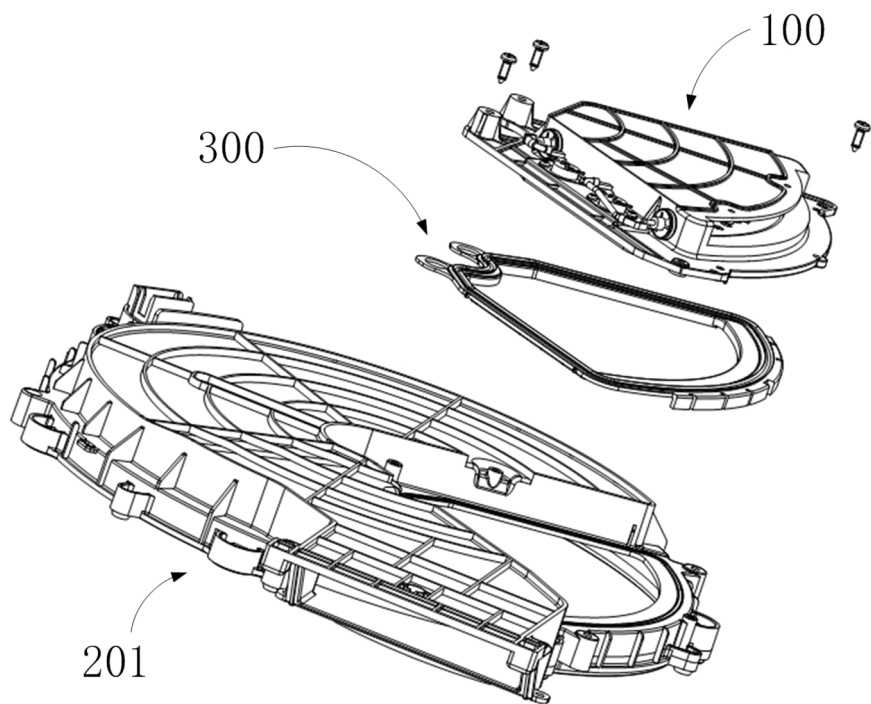


FIG. 3

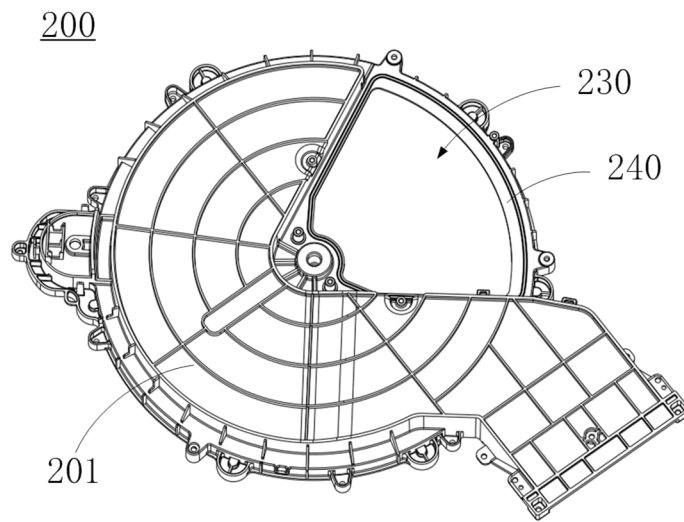


FIG. 4

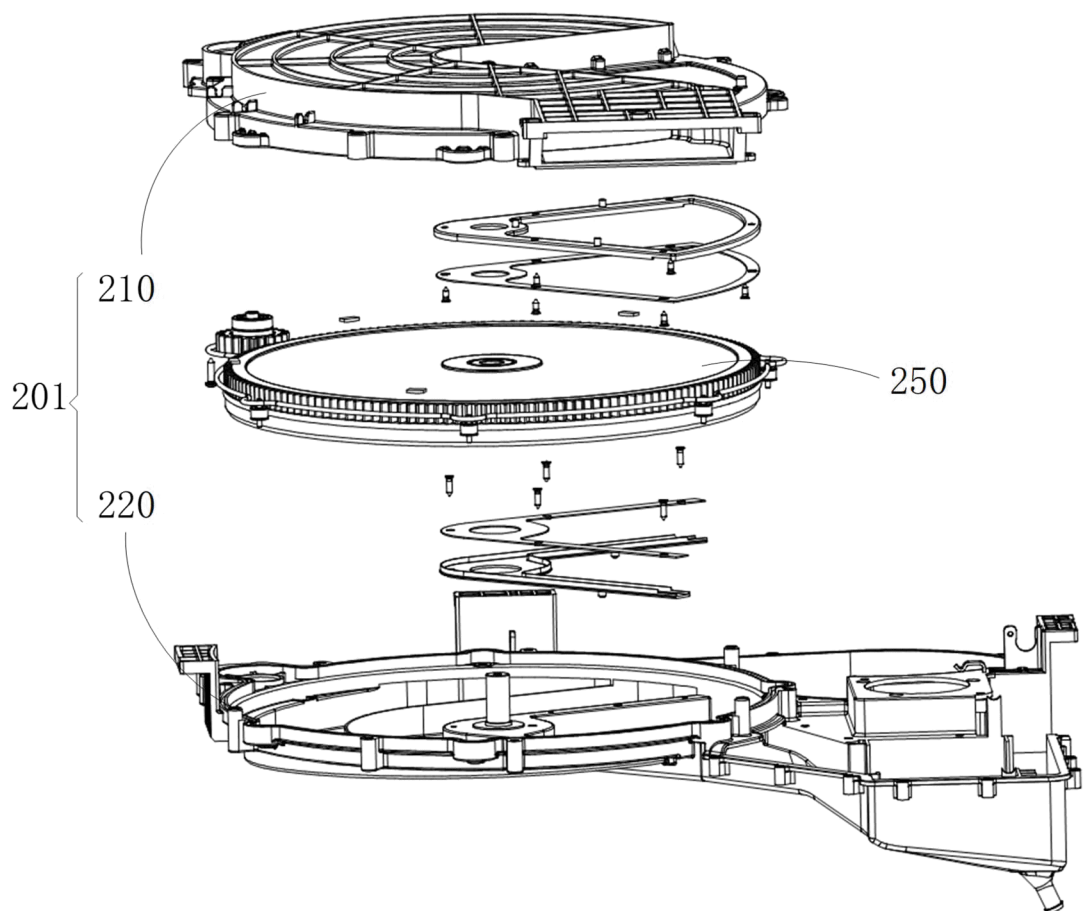


FIG. 5

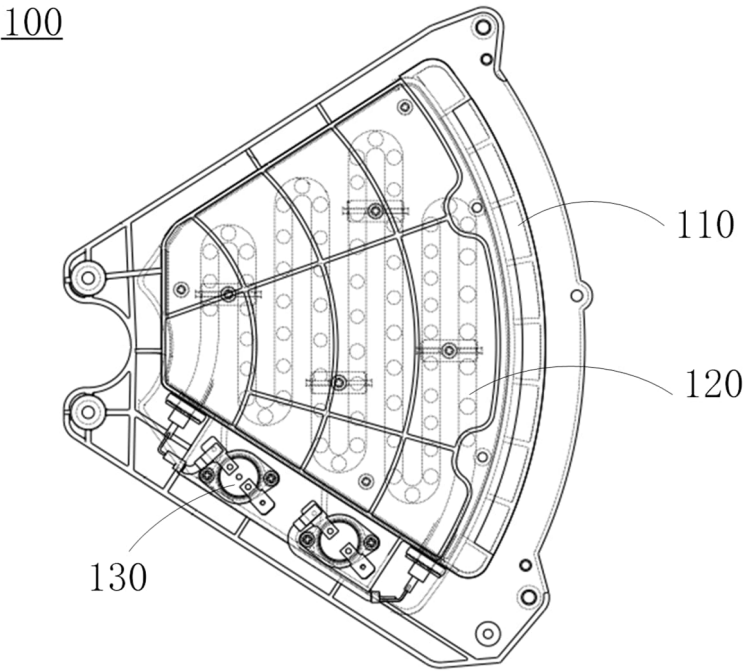


FIG. 6

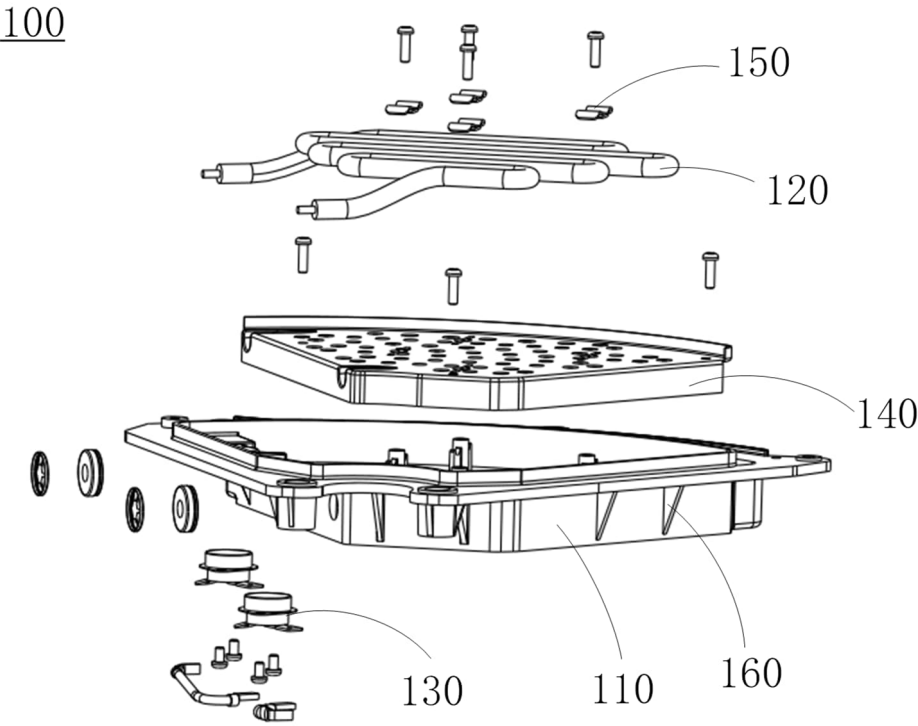


FIG. 7

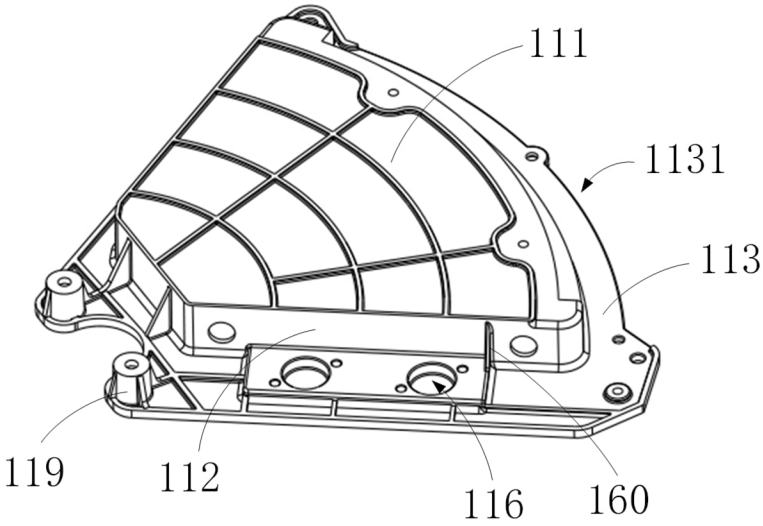


FIG. 8

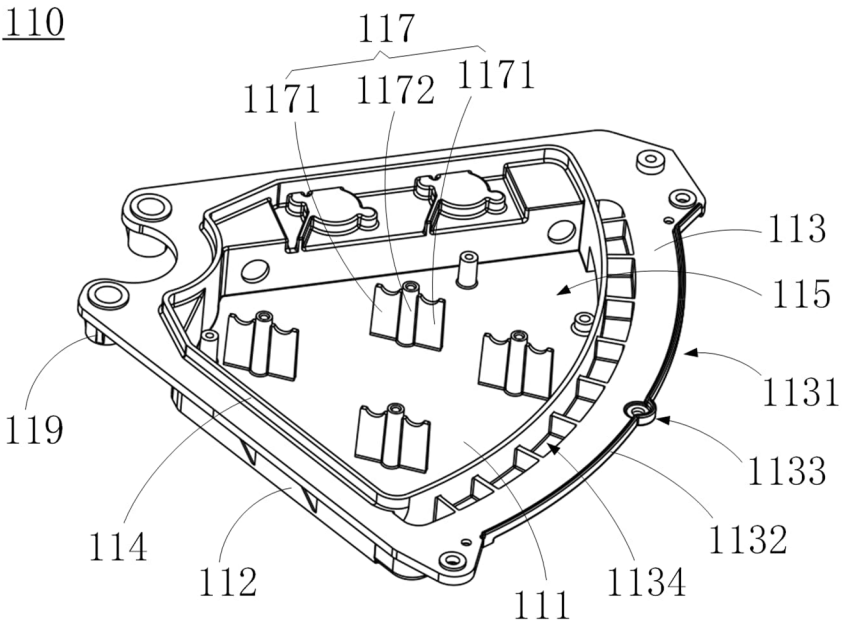


FIG. 9

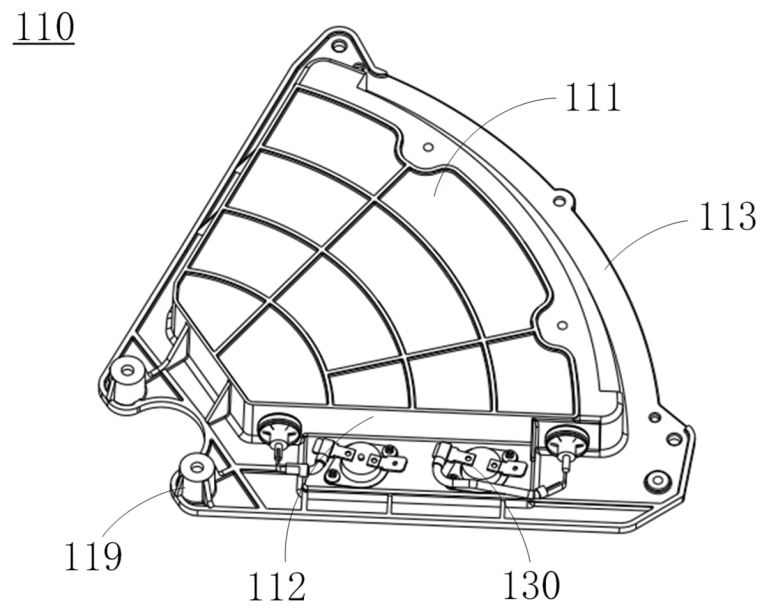


FIG. 10

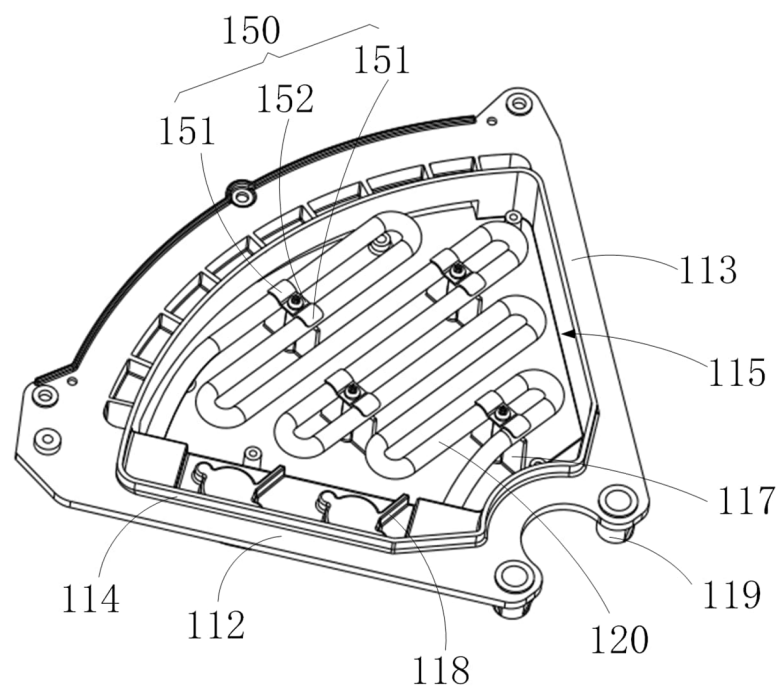


FIG. 11

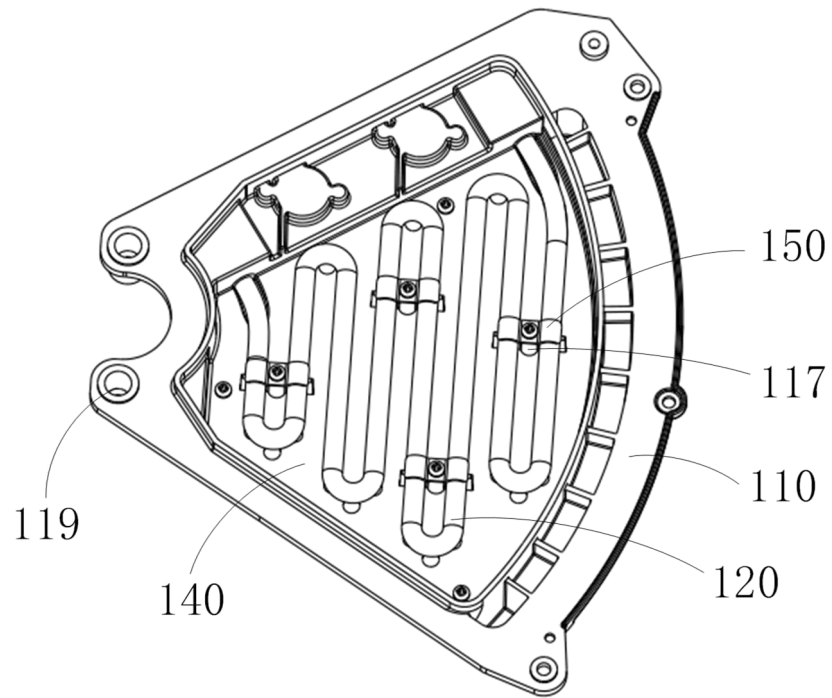


FIG. 12

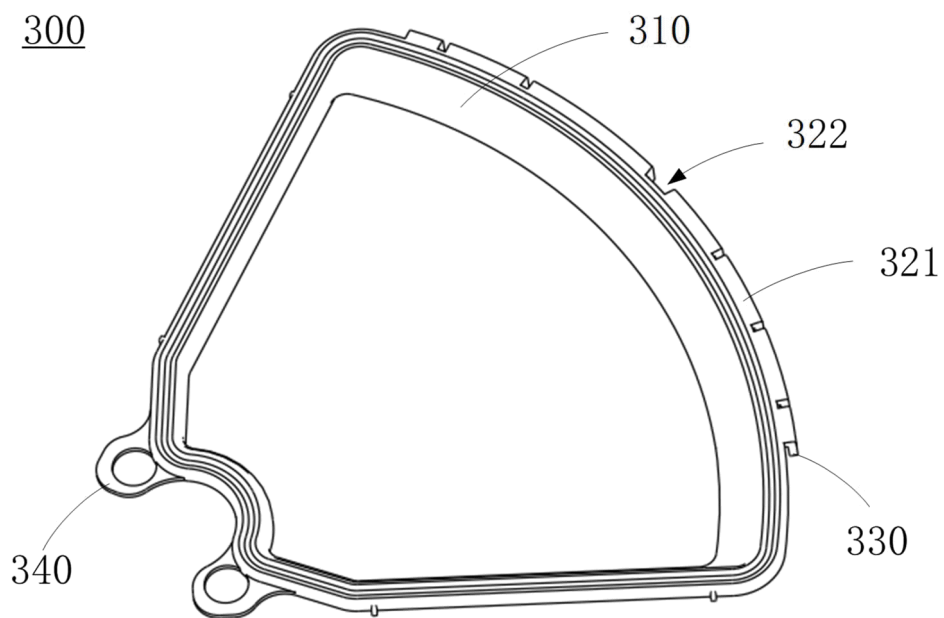


FIG. 13

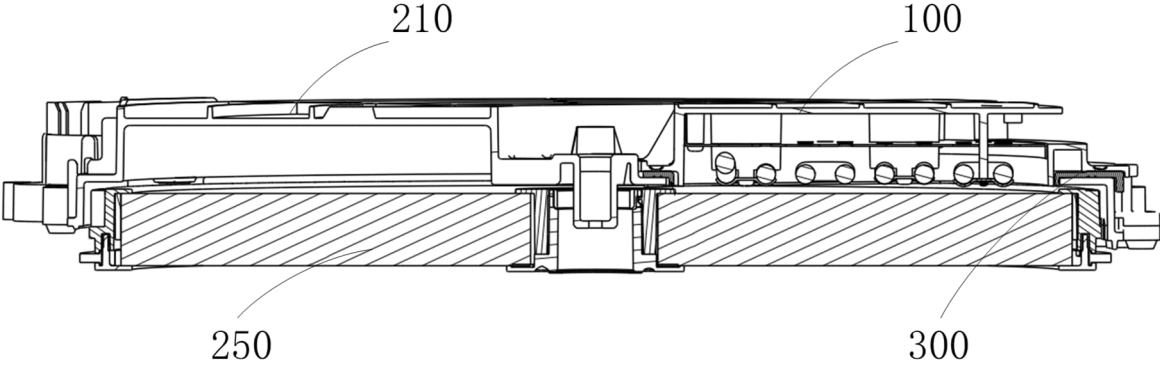


FIG. 14

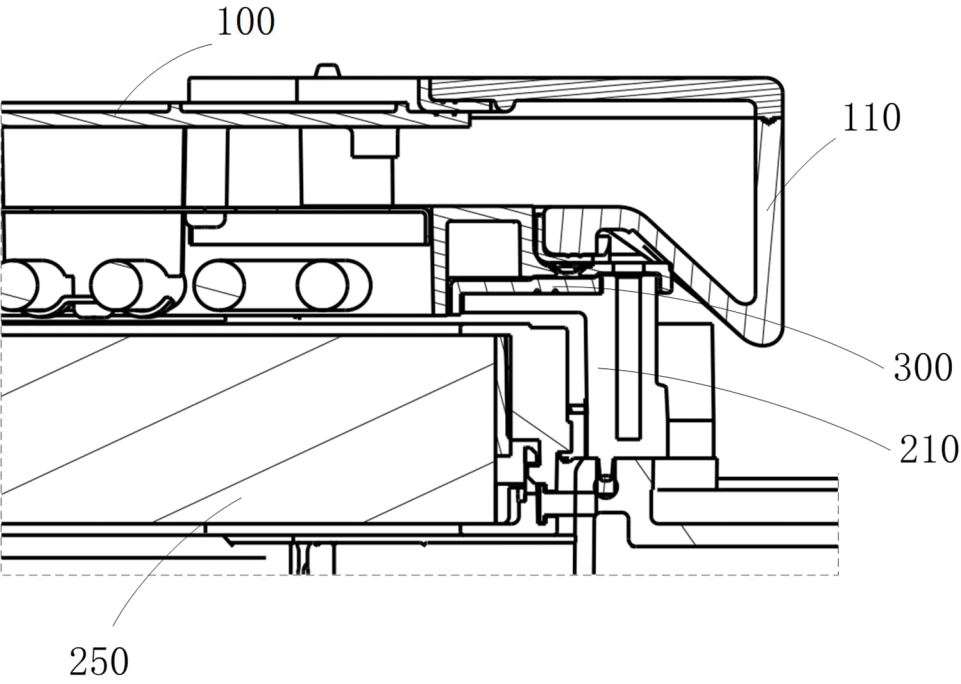


FIG. 15

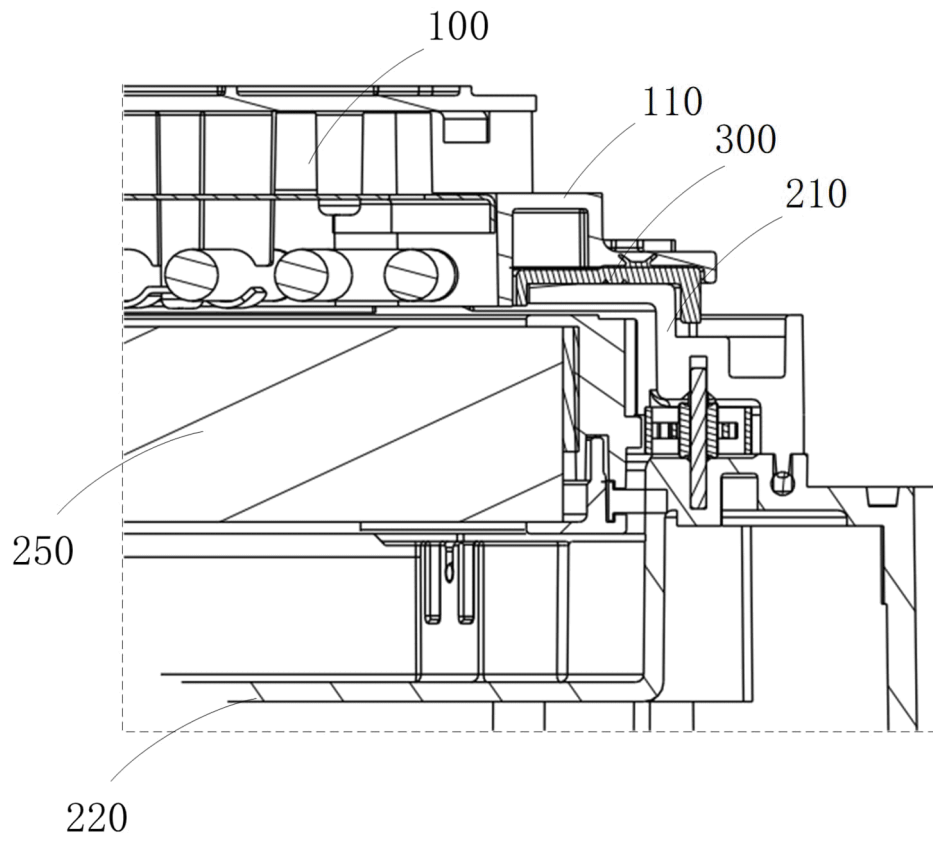


FIG. 16

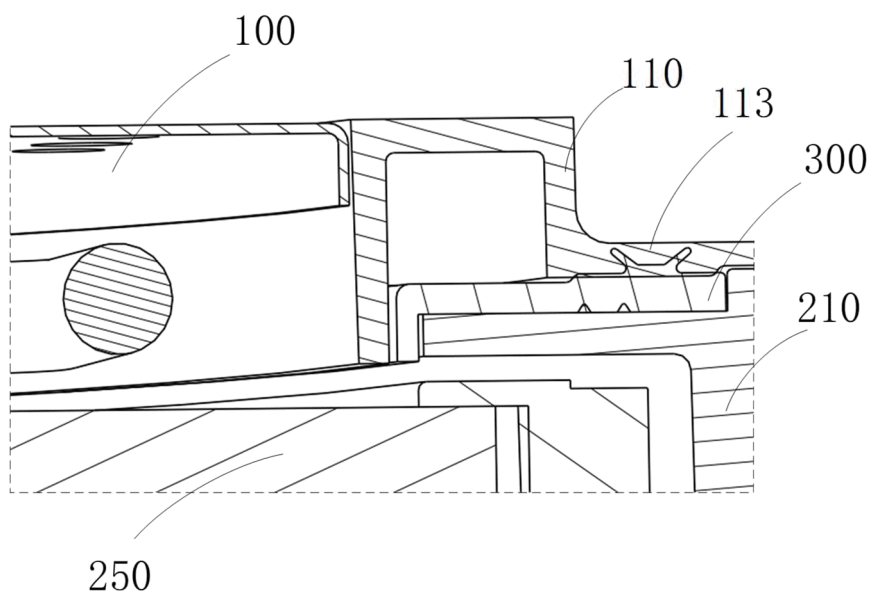


FIG. 17

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2024/115208

A. CLASSIFICATION OF SUBJECT MATTER

D06F58/26(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:D06F

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)

CNTXT, ENTXTC, VEN, WPABS, WPABSC: 加热, 烘干, 密封, 隔绝, 隔热, 壳, 凸起, 凸出, 突出, 反射, heat+, dry+, seal+, heat insulat+, shell?, bulge, protrud+, reflect+.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 220724627 U (SHENZHEN ROBOROCK INNOVATION TECHNOLOGY CO., LTD.) 05 April 2024 (2024-04-05) description, paragraphs [0063]-[0128], and figures 1-17	1-20
PX	CN 220724615 U (SHENZHEN ROBOROCK INNOVATION TECHNOLOGY CO., LTD.) 05 April 2024 (2024-04-05) description, paragraphs [0070]-[0168], and figures 1-12	1-3, 5-8, 13, 15-20
PX	CN 220564923 U (SHENZHEN ROBOROCK INNOVATION TECHNOLOGY CO., LTD.) 08 March 2024 (2024-03-08) description, paragraphs [0072]-[0125], and figures 1-10	1, 3, 5-8, 15-20
Y	CN 115726129 A (SHENZHEN ROBOROCK INNOVATION TECHNOLOGY CO., LTD.) 03 March 2023 (2023-03-03) description, paragraphs [0036]-[0080], and figures 1-9	1-16, 19-20
Y	CN 213173057 U (NINGBO KAIBO GROUP CO., LTD.) 11 May 2021 (2021-05-11) description, paragraphs [0026]-[0034], and figures 1-8	1-16, 19-20

☒ 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

05 November 2024

Date of mailing of the international search report

22 November 2024

Name and mailing address of the ISA/CN

China National Intellectual Property Administration (ISA/
CN)
China No. 6, Xitucheng Road, Jimengqiao, Haidian District,
Beijing 100088

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2024/115208

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 111101350 A (WUXI LITTLE SWAN ELECTRIC CO., LTD.) 05 May 2020 (2020-05-05) description, paragraphs [0042]-[0072], and figures 1-2	2, 13
Y	CN 219317599 U (SHENZHEN ROBOROCK INNOVATION TECHNOLOGY CO., LTD.) 07 July 2023 (2023-07-07) description, paragraphs [0032]-[0043], and figures 1-5	15-16,19-20
A	CN 209669540 U (WUXI LITTLE SWAN ELECTRIC CO., LTD.) 22 November 2019 (2019-11-22) entire document	1-20
A	JP 2003269746 A (MATSUSHITA ECOLOGY SYSTEMS CO., LTD.) 25 September 2003 (2003-09-25) entire document	1-20

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2024/115208

5

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 220724627 U	05 April 2024	None	
CN 220724615 U	05 April 2024	None	
CN 220564923 U	08 March 2024	None	
CN 115726129 A	03 March 2023	TW 202411491 A	16 March 2024
		CN 115726128 A	03 March 2023
		CN 218521470 U	24 February 2023
		CN 218521471 U	24 February 2023
CN 213173057 U	11 May 2021	None	
CN 111101350 A	05 May 2020	CN 111101350 B	27 September 2022
CN 219317599 U	07 July 2023	TW M654926 U	01 May 2024
		WO 2024146215 A1	11 July 2024
CN 209669540 U	22 November 2019	None	
JP 2003269746 A	25 September 2003	JP 3581137 B2	27 October 2004

Form PCT/ISA/210 (patent family annex) (July 2022)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 202311136296 [0001]