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(71) Applicant: **Wuhu Midea Smart Kitchen Appliance
Manufacturing Co., Ltd.**

Wuhu, Anhui 241000 (CN)

(72) Inventors:

- **XIN, Sensen**
Wuhu, Anhui 241000 (CN)
- **ZHANG, Shimei**
Wuhu, Anhui 241000 (CN)
- **CHENG, Yitian**
Wuhu, Anhui 241000 (CN)
- **WANG, Fu**
Wuhu, Anhui 241000 (CN)

(74) Representative: **RGTH**

Patentanwälte PartGmbB
Neuer Wall 10
20354 Hamburg (DE)

(54) **MAGNESIUM ROD ASSEMBLY, WATER HEATER LINER AND WATER HEATER**

(57) Provided are a magnesium rod assembly, an inner tank for a water heater and a water heater. The magnesium rod assembly includes a magnesium rod body and a covering member. The covering member is disposed on the magnesium rod body and covers a portion of an outer surface of the magnesium rod body. The magnesium rod assembly of the present disclosure can solve a problem of short service life of a magnesium rod in the prior art.

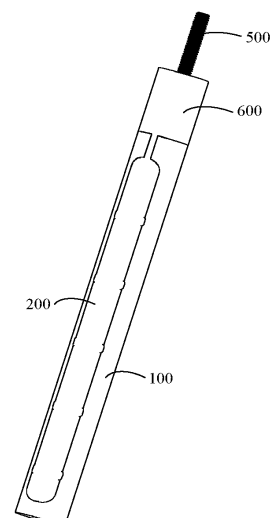


FIG. 1

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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

5 **[0001]** This application claims priorities of the Chinese patent application Nos. 202210747257.8, 202221655611.6, 202222874742. X, 202221655697.2, and 202221655638.5 filed on June 28, 2022, all of which are hereby incorporated by reference in their entireties.

TECHNICAL FIELD

10 **[0002]** The present disclosure relates to a technical field of water heaters, and in particular to a magnesium rod assembly, an inner tank for a water heater, and a water heater.

BACKGROUND

15 **[0003]** When an existing water heater is used, a magnesium rod is usually used to protect an inner tank for the water heater, to prevent the inner tank from being corroded by corrosive ions in the water. However, an existing magnesium rod suffers from rapid wear and tear due to long-term exposure to water during use, so that the magnesium rod has a shorter service life. That is, there is a problem of short service life of the magnesium rod in the prior art.

SUMMARY

20 **[0004]** The main purpose of the present disclosure is to provide a magnesium rod assembly, an inner tank for a water heater and a water heater, aiming to solve a problem of short service life of magnesium rods in the prior art.

25 **[0005]** In order to achieve the above purpose, the present disclosure proposes a magnesium rod assembly for the inner tank for the water heater, including:

a magnesium rod body; and

30 a covering member, disposed on the magnesium rod body and covering a portion of an outer surface of the magnesium rod body.

[0006] Optionally, the outer surface of the magnesium rod body is provided with a recess, The covering member is disposed in the recess to cover the portion of the outer surface of the magnesium rod body.

35 **[0007]** Optionally, the magnesium rod body has, along an axial direction thereof, a connecting end and a free end opposite to one another. The covering member is attached to the free end of the magnesium rod body to cover an outer surface of the free end of the magnesium rod body.

[0008] Optionally, the recess includes a cavity extending along the axial direction of the magnesium rod body, the cavity passing through the magnesium rod body along a radial direction of the magnesium rod body. The covering member includes a first covering body in the cavity.

40 **[0009]** Optionally, the recess further includes a groove disposed on an outer peripheral wall of the magnesium rod body, the groove being in communication with the cavity; and the covering member further includes a second covering body in the groove, the second covering body being connected to the first covering body.

45 **[0010]** Optionally, the groove includes a plurality of first grooves, the plurality of first grooves being arranged in sequence at an interval on the outer peripheral wall of the magnesium rod body along the axial direction of the magnesium rod body, each of the first grooves being disposed in an annular shape along a circumferential direction of the magnesium rod body and in communication with the cavity; and the second covering body includes a plurality of first covering strips disposed in correspondence with the plurality of first grooves, the first covering strips being connected to the first covering body.

50 **[0011]** Optionally, the groove further includes a second groove disposed on the outer peripheral wall of the magnesium rod body, the second groove extending along the axial direction of the magnesium rod body and in communication with the first grooves; and the second covering body further includes a second covering strip disposed in correspondence with the second groove, the second covering strip being connected to the first covering strip.

55 **[0012]** Optionally, the recess includes a plurality of first trenches, the plurality of first trenches being arranged in sequence at an interval on the outer peripheral wall of the magnesium rod body along the circumferential direction of the magnesium rod body, each of the first trenches extending along the axial direction of the magnesium rod body; and the covering member includes a plurality of first covering segments disposed in correspondence with the plurality of first trenches.

[0013] Optionally, the recess further includes a plurality of second trenches, and the plurality of second trenches are

arranged in sequence at an interval on the outer peripheral wall of the magnesium rod body along the axial direction of the magnesium rod body, each of the second trenches being disposed in an annular shape along the circumferential direction of the magnesium rod body. The covering member further includes a plurality of second covering segments disposed in correspondence with the plurality of second trenches.

[0014] Optionally, a concave hole is disposed on a wall of the free end of the magnesium rod body. The covering member includes a covering plate and a covering column disposed on a side of the covering plate, the covering column being filled within the concave hole, the covering plate covering an outer surface of the free end of the magnesium rod body.

[0015] Optionally, the magnesium rod assembly further includes a first conductive member, a resistance and a second conductive member. The magnesium rod body has, along the axial direction thereof, a connecting end and a free end opposite to one another. A portion of the first conductive member is disposed within the connecting end, another portion of the first conductive member being disposed outside the connecting end. The magnesium rod body, the first conductive member, the resistance and the second conductive member are connected in sequence.

[0016] Optionally, the magnesium rod assembly further includes a fixing member. The fixing member is wrapped around outer surfaces of the another portion of the first conductive member, the resistance and a portion of the second conductive member, and another portion of the second conductive member is disposed outside the fixing member; and/or, the connecting end of the magnesium rod body is disposed with a lug boss, the portion of the first conductive member being disposed within the lug boss, the fixing member being wrapped around an outer surface of the lug boss.

[0017] Optionally, the fixing member is an insulating member; and the fixing member, the first conductive member, the resistance and the second conductive member are of an integrated structure; and/or,

the covering member is an insulating member, an end of the covering member being connected to an end of the fixing member, and the covering member and the fixing member being integrally injection molded.

[0018] Optionally, the covering member is detachably disposed on the magnesium rod body; and/or, the covering member is in a form of an annular grid structure.

[0019] Optionally, the covering member is made of a silicone material, sleeved on the magnesium rod body and attached within the recess; or

the covering member includes a first insulation bracket and a second insulation bracket; an annular grid structure is enclosed by the first insulation bracket and the second insulation bracket; the first insulation bracket and the second insulation bracket are detachably connected; the first insulation bracket is attached within a portion of the recess; and the second insulation bracket is attached within another portion of the recess to cover the portion of the outer surface of the magnesium rod body.

[0020] In order to achieve the above purpose, the present disclosure further proposes a magnesium rod assembly for the inner tank for the water heater, including:

a magnesium rod body, made of a rare earth-magnesium alloy material, and

a covering member, disposed on the magnesium rod body and covering a portion of an outer surface of the magnesium rod body.

[0021] Optionally, the magnesium rod assembly also includes a first conductive member, a resistance and a second conductive member. The magnesium rod body has, along the axial direction thereof, a connecting end and a free end opposite to one another. A portion of the first conductive member is disposed within the connecting end, and another portion of the first conductive member is disposed outside the connecting end. The magnesium rod body, the first conductive member, the resistance and the second conductive member are connected in sequence.

[0022] Optionally, the covering member is detachably disposed on the magnesium rod body.

[0023] The present disclosure also proposes an inner tank for a water heater. The inner tank for the water heater includes the magnesium rod assembly as described above. The magnesium rod assembly includes a magnesium rod body and a covering member. The covering member is disposed on the magnesium rod body and covers a portion of an outer surface of the magnesium rod body.

[0024] The present disclosure also proposes a water heater. The water heater includes the inner tank for the water heater as described above. The inner tank for the water heater includes a magnesium rod assembly as described above. The magnesium rod assembly includes a magnesium rod body and a covering member. The covering member is disposed on the magnesium rod body and covers a portion of an outer surface of the magnesium rod body.

[0025] The magnesium rod assembly of the present disclosure includes a magnesium rod body and a covering member. The covering member is disposed on the magnesium rod body and covers a portion of an outer surface of the magnesium rod body. With such arrangement, when the magnesium rod assembly is disposed in an inner tank for a water heater for performing an anti-corrosion protection on the inner tank for the water heater, since the covering member covers a portion of an outer surface of the magnesium rod body, the covering member can isolate the portion of the outer surface of the magnesium rod body from water when the magnesium rod assembly is preliminarily consumed, that is, the covering member reduces a surface area of the magnesium rod body in contact with water, that is, a reaction area of the magnesium

rod body in contact with water for ionization is reduced. Therefore, a consumption rate of the magnesium rod body can be slowed down, to achieve an effect of extending a service life of the magnesium rod body. It can be seen that, the magnesium rod assembly of the present disclosure can solve a problem of short service life of the magnesium rods in the prior art.

BRIEF DESCRIPTION OF DRAWINGS

[0026] In order to illustrate the embodiments of the present disclosure or the technical solutions in the prior art more clearly, the accompanying drawings needed to be used in the description of the embodiments or the prior art will be briefly introduced below. Obviously, the accompanying drawings in the following description only illustrate some embodiments of the present disclosure. For those skilled in the art, other accompanying drawings can be obtained based on the structures shown in these accompanying drawings without exerting creative efforts.

FIG. 1 is a schematic structural diagram of a first embodiment of a magnesium rod assembly of the present disclosure;

FIG. 2 is a schematic structural diagram of the magnesium rod assembly in FIG. 1 after exploded;

FIG. 3 is an enlarged view of a portion indicated by A in FIG. 2;

FIG. 4 is a schematic structural diagram of a second embodiment of the magnesium rod assembly of the present disclosure;

FIG. 5 is a schematic structural diagram of the magnesium rod assembly in FIG. 4 after exploded;

FIG. 6 is an enlarged view of a portion indicated by B in FIG. 5;

FIG. 7 is a schematic structural diagram of a third embodiment of the magnesium rod assembly of the present disclosure;

FIG. 8 is a schematic structural diagram of the magnesium rod assembly in FIG. 7 after exploded;

FIG. 9 is an enlarged view of a portion indicated by C in FIG. 8;

FIG. 10 is a schematic structural diagram of a fourth embodiment of the magnesium rod assembly of the present disclosure;

FIG. 11 is a schematic structural diagram of the magnesium rod assembly in FIG. 10 after exploded;

FIG. 12 is an enlarged view of a portion indicated by D in FIG. 11;

FIG. 13 is a schematic structural diagram of a fifth embodiment of the magnesium rod assembly of the present disclosure;

FIG. 14 is a schematic structural diagram of the magnesium rod assembly in FIG. 13 after exploded;

FIG. 15 is a schematic structural diagram of a sixth embodiment of the magnesium rod assembly of the present disclosure;

FIG. 16 is a schematic structural diagram of the magnesium rod assembly in FIG. 15 after exploded;

FIG. 17 is an enlarged view of a portion indicated by E in FIG. 16;

FIG. 18 is a schematic structural diagram of a seventh embodiment of the magnesium rod assembly of the present disclosure;

FIG. 19 is a schematic structural diagram of the magnesium rod assembly in FIG. 18 after exploded;

FIG. 20 is an enlarged view of a portion indicated by F in FIG. 19;

FIG. 21 is a schematic structural diagram of an eighth embodiment of the magnesium rod assembly of the present disclosure;

FIG. 22 is a schematic structural diagram of the magnesium rod assembly in FIG. 21 after exploded;

FIG. 23 is a schematic structural diagram of the magnesium rod assembly in FIG. 22 from another perspective;

FIG. 24 is an enlarged view of a portion indicated by G in FIG. 23;

FIG. 25 is a schematic structural diagram of a ninth embodiment of the magnesium rod assembly of the present disclosure;

FIG. 26 is a schematic structural diagram of the magnesium rod assembly in FIG. 25 after exploded;

FIG. 27 is an enlarged view of a portion indicated by H in FIG. 26;

FIG. 28 is a schematic partial structural diagram of the magnesium rod assembly in FIG. 26;

FIG. 29 is a cross-sectional view of the magnesium rod assembly in FIG. 26;

FIG. 30 is an enlarged view of a portion indicated by I in FIG. 29;

FIG. 31 is a cross-sectional view of the magnesium rod assembly in FIG. 25;

FIG. 32 is a schematic structural diagram of a tenth embodiment of the magnesium rod assembly of the present disclosure;

FIG. 33 is a schematic structural diagram of the magnesium rod assembly in FIG. 32 after exploded;

FIG. 34 is a schematic partial structural diagram of the magnesium rod assembly in FIG. 33;

FIG. 35 is a cross-sectional view of the magnesium rod assembly in FIG. 32 along an axial direction thereof;

FIG. 36 is a schematic partial structural diagram of the magnesium rod assembly in FIG. 32 after exploded;

FIG. 37 is an enlarged view of a portion indicated by J in FIG. 36;

FIG. 38 is a cross-sectional view of the magnesium rod assembly in FIG. 32 along a radial direction thereof;

FIG. 39 is a schematic structural diagram of another embodiment of a second insulation bracket in FIG. 33;

FIG. 40 is an enlarged view of a portion indicated by K in FIG. 39;

FIG. 41 is a cross-sectional view of the second insulation bracket in FIG. 39 for the magnesium rod assembly in FIG. 32;

FIG. 42 is a schematic structural diagram of a further embodiment of the second insulation bracket in FIG. 33;

FIG. 43 is an enlarged view of a portion indicated by L in FIG. 42; and

FIG. 44 is a cross-sectional view of the second insulation bracket in FIG. 42 for the magnesium rod assembly in FIG. 32.

Illustration of reference numbers:

[0027]

Reference numbers	Name	Reference numbers	Name
100	magnesium rod body	223	third covering strip
110	recess	230	fourth covering strip
111	cavity	240	first covering segment
112	groove	250	second covering segment
1121	first groove	260	covering plate
1122	second groove	270	covering column
1123	third groove	201	first insulation bracket
113	fourth groove	202	second insulation bracket
114	first trench	203	hook
115	second trench	204	slot
120	concave hole	205	first rod body
130	lug boss	206	second rod body
200	covering member	300	first conductive member
210	first covering body	400	resistance
220	second covering body	500	second conductive member
221	first covering strip	600	fixing member
222	second covering strip		

[0028] The implementation of the purpose, functional features and advantages of the present disclosure will be further described with reference to the embodiments and the accompanying drawings.

DESCRIPTION OF EMBODIMENTS

[0029] The technical solutions in the embodiments of the present disclosure will be clearly and completely described below with reference to the accompanying drawings in the embodiments of the present disclosure. Obviously, the described embodiments are only some embodiments of the present disclosure, rather than all embodiments. Based on the embodiments in the present disclosure, all other embodiments obtained by those skilled in the art without creative efforts fall within the protection scope sought for by the present disclosure.

[0030] It should be noted that if there are directional instructions (such as up, down, left, right, front, back...) in the embodiments of the present disclosure, the directional instructions are only used to illustrate the relative positional relationship, movement situation and so on among various components under a position of a specific posture (as shown in the accompanying drawings). If the specific posture changes, the directional indications will also change accordingly.

[0031] In addition, if there are descriptions involving "first", "second" and so on in the embodiments of the present

disclosure, the descriptions of "first", "second" and so on are only for descriptive purposes and should not be understood as indication or implications of relative importance or implicit indication of the number of technical features indicated. Therefore, features defined as "first" and "second" may explicitly or implicitly include at least one such feature. In addition, the technical solutions in various embodiments can be combined with one another, but the combined technical solutions must be based on that they can be implemented by those skilled in the art. When the combined technical solutions are contradictory or cannot be realized, it should be considered that such combined technical solutions do not exist, and are not within the protection scope sought for by the present disclosure.

[0032] The present disclosure proposes a magnesium rod assembly, an inner tank for a water heater including the magnesium rod assembly, and a water heater including the inner tank for the water heater. The magnesium rod assembly of the present disclosure can solve a problem of short service life of a magnesium rod in the prior art.

[0033] In the embodiments shown in FIG. 1, FIG. 4, FIG. 7 and FIG. 10, a magnesium rod assembly is for an inner tank for a water heater. The magnesium rod assembly includes a magnesium rod body 100 and a covering member 200. The covering member 200 is disposed on the magnesium rod body 100 and covers a portion of an outer surface of the magnesium rod body 100.

[0034] It can be understood that the covering member 200 can cover the portion of the outer surface of the magnesium rod body 100 in various ways. In some embodiments, the covering member 200 is sleeved on the outer surface of the magnesium rod body 100, and the outer surface of the magnesium rod body 100 is not processed. In other embodiments, the outer surface of the magnesium rod body 100 is provided with a recess 110, and the covering member 200 is disposed in the recess 110 to cover the outer surface of the magnesium rod body 100. The specific manner in which the covering member 200 is disposed on the magnesium rod body 100 is not limited, as long as the covering member 200 is disposed on the magnesium rod body 100 to reduce an exposed outer surface of the magnesium rod body 100. In some embodiments, the covering member 200 is made of a silicone material and the covering member 200 is sleeved on the magnesium rod body 100. In other embodiments, the covering member 200 is made of a plastic material, and the covering member 200 wraps around and covers on the magnesium rod body 100. It can be understood that the covering member 200 reduces the exposed outer surface of the magnesium rod body 100, that is, when the magnesium rod assembly is used, the covering member 200 isolates a portion of the outer surface of the magnesium rod body 100 from water. When the rod assembly is initially used, the covering member 200 reduces a surface area of the magnesium rod body 100 in contact with water, that is, a reaction area of the magnesium rod body 100 in contact with water for ionization is reduced, and therefore a corrosion rate of the magnesium rod body 100 is reduced, that is, an initial consumption rate of the magnesium rod body 100 is slowed down, and thus an effect of extending a service life of the magnesium rod body 100 is achieved.

[0035] In an embodiment, the covering member 200 is made of an insulating material, such as but not limited to: silicone, plastic, or ceramics and so on.

[0036] The magnesium rod assembly of the present disclosure includes a magnesium rod body 100 and a covering member 200, the covering member 200 disposed on the magnesium rod body 100 and covering a portion of an outer surface of the magnesium rod body 100. With such arrangement, when the magnesium rod assembly is disposed in an inner tank for a water heater for performing an anti-corrosion protection on the inner tank for the water heater, since the covering member 200 covers the portion of the outer surface of the magnesium rod body 100, the covering member 200 can isolate the portion of the outer surface of the magnesium rod body 100 from water when the magnesium rod assembly is preliminarily consumed, that is, the covering member 200 reduces a surface area of the magnesium rod body 100 in contact with water, that is, a reaction area of the magnesium rod body 100 in contact with water for ionization is reduced. Therefore, a consumption rate of the magnesium rod body 100 can be slowed down, and an effect of extending a service life of the magnesium rod body 100 can be achieved. It can be seen that, with the magnesium rod assembly of the present disclosure, the problem of short service life of the magnesium rod in the prior art can be solved.

[0037] Referring to FIG. 2. In an embodiment, the outer surface of the magnesium rod body 100 is disposed with a recess 110, and the covering member 200 is disposed in the recess 110 to cover a portion of the outer surface of the magnesium rod body 100.

[0038] It can be understood that the magnesium rod body 100 can be formed by a manner of casting, and the recess 110 on the outer surface of the magnesium rod body 100 can be formed in a variety of ways. In some embodiments, the magnesium rod body 100 and the recess 110 on the magnesium rod body 100 are directly molded by a manner of casting. In other embodiments, the magnesium rod body 100 is first formed by the manner of casting, and then the magnesium rod body 100 is machined to make an outer wall surface of the magnesium rod body 100 to have the recess 110.

[0039] The covering member 200 may be disposed in the recess 110 in a variety of ways. In some embodiments, the covering member 200 is made of a silicone material, and is filled in the recess 110. In other embodiments, the covering member 200 is an insulating member, and is formed within the recess 110 by a manner of injection molding to cover a portion of an outer surface of the magnesium rod body 100. In further embodiments, the covering member 200 is composed of a plurality of components which can be detachably connected, and thus the covering member 200 can be

snapped within the recess 110 by way of assembling. In some embodiments, the covering member 200 can also be a whole body, and the entire covering member 200 is snapped within the recess 110. It can be seen that the way by which the covering member 200 covers the portion of the outer surface of the magnesium rod body 100 is not limited, as long as the covering member 200 can reduce the surface area of the magnesium rod body 100 exposed to an outside.

[0040] Since the recess 110 is provided on the outer surface of the magnesium rod body 100 and the covering member 200 is disposed in the recess 110, an overall dimension of the magnesium rod body 100 may not be changed by the covering member 200, that is, an outer diameter and/or a length dimension of the magnesium rod body 100 may not be changed, and therefore an assembling of the magnesium rod body 100 and the inner tank for the water heater may not be affected.

[0041] Referring to FIG. 1 to FIG. 3, in an embodiment, an outer peripheral wall of the magnesium rod body 100 is disposed with the recess 110, and the covering member 200 is disposed in the recess 110 to cover a portion of an outer surface of the outer peripheral wall of the magnesium rod body 100.

[0042] It can be understood that the covering member 200 is disposed in the recess 110, and an outermost surface of the covering member 200 may be flush with an outermost surface of the magnesium rod body 100, and thus the covering member 200 does not exceed the outermost surface of the magnesium rod body 100. That is, the overall dimension of the magnesium rod body 100 will not be affected by the covering member 200. In this way, an outer diameter of the magnesium rod body 100 is equal to an outer diameter of the magnesium rod assembly, and thus the covering member 200, when the magnesium rod assembly is installed inside the inner tank for the water heater, will not affect the installation of the magnesium rod assembly. The magnesium rod assembly of the present disclosure and an existing magnesium rod can be directly replaced with one another. In other embodiments, the outermost surface of the covering member 200 may also be lower than the outermost surface of the magnesium rod body 100. In further embodiments, the outermost surface of the covering member 200 may be higher than the outermost surface of the magnesium rod body 100. Whether the outermost surface of the covering member 200 is flush with, lower or higher than that of the magnesium rod body 100 can be set according to an actual dimension of the inner tank for the water heater, and which is not limited herein.

[0043] Since the surface area of the outer peripheral wall of the magnesium rod body 100 is relatively large, it is conducive to increasing a coverage area of the covering member 200 by providing the recess 110 on the outer peripheral wall of the magnesium rod body 100, and in turn it is conducive to reducing an exposed surface area of the magnesium rod body 100, that is, it is conducive to reducing an area of the magnesium rod body 100 in contact with water. In this way, the consumption rate of the magnesium rod body 100 is slowed down to achieve the effect of extending the service life of the magnesium rod body 100.

[0044] Referring to FIG. 2 and FIG. 3, in an embodiment, the recess 110 includes a cavity 111 which is extending along an axial direction of the magnesium rod body 100, and passes through the magnesium rod body 100 along a radial direction of the magnesium rod body 100. The covering member 200 includes a first covering body 210 filled in the cavity 111.

[0045] It can be understood that the cavity 111 is extended through the magnesium rod body 100, and the first covering body 210 is filled in the cavity 111. Two opposite side surfaces of the first covering body 210 disposed along the radial direction of the magnesium rod body 100 are the outer surfaces which cover the magnesium rod body 100. That is to say, areas of the two side surfaces of the first covering body 210 disposed along the radial direction of the magnesium rod body 100 is a reduced area of the outer surface of the magnesium rod body 100. In this way, it is conducive to reducing the area of the magnesium rod body 100 in contact with water, and thus the consumption rate of the magnesium rod body 100 is slowed down to achieve the effect of extending the service life of the magnesium rod body 100.

[0046] In an embodiment, the first covering member 200 is disposed in the cavity 111, which is also beneficial to enhancing a strength of the magnesium rod body 100 and preventing the magnesium rod body 100 from being easily broken due to corrosion when disposed inside the inner tank for the water heater, and thus the strength of the magnesium rod body 100 is improved.

[0047] Upon the outer surface of the magnesium rod body 100 around the first covering member 200 is consumed and corroded, the cavity 111 of the magnesium rod body 100 increases, and the first covering member 200 no longer covers a cavity wall of the cavity 111 of the magnesium rod body 100. At this time, the magnesium rod body 100 has performed the anti-corrosion protection on the inner tank for the water heater for a period of time. As the exposed surface area of the magnesium rod body 100 increases, the surface area of the magnesium rod body 100 in contact with water increases, and thus the magnesium rod body 100 is enabled to provide a stable and continuous anti-corrosion protection for the inner tank for the water heater.

[0048] Referring to FIG. 4 to FIG. 6, in an embodiment, the recess 110 further includes a groove 112 which is disposed on the outer peripheral wall of the magnesium rod body 100, and in communication with the cavity 111. The covering member 200 further includes a second covering body 220 in the groove 112, and the second covering body 220 is connected to the first covering body 210.

[0049] It can be understood that, the outer peripheral wall of the magnesium rod body 100 is provided with a groove

112 thereon, the groove 112 being in communication with the cavity 111. The second covering body 220 is filled within the groove 112. In this way, a covered area of the outer surface of the magnesium rod body 100 is increased, that is, the surface area of the magnesium rod body 100 in contact with water is reduced. That is to say, the reaction area of the magnesium rod body 100 in contact with water for ionization is further reduced by providing the groove 112. In an implementation, the corrosion rate of the magnesium rod body 100 is reduced, and thus the service life of the magnesium rod body 100 is increased.

[0050] A specific structure of the second covering body 220 is not limited. In some embodiments, the second covering body 220 is, but not limited to, an elongated shape, a spiral shape, a ring shape, a circular shape and so on. The second covering body 220 is connected to the first covering body 210, and thus a strength of the covering member 200 is enhanced. The second covering body 220 and the first covering body 210 both can support the magnesium rod body 100, and therefore the magnesium rod body 100 is prevented from being easily broken due to erosion for a period of time, and thus a reliability of corroded components is improved.

[0051] Referring to FIG. 5 and FIG. 6, in an embodiment, the groove 112 includes a plurality of first grooves 1121. The plurality of first grooves 1121 are arranged in sequence and at intervals on the outer peripheral wall of the magnesium rod body 100 along the axial direction of the magnesium rod body 100. Each of the first grooves 1121 is disposed in an annular shape along a circumferential direction of the magnesium rod body 100 and is in communication with the cavity 111. The second covering body 220 includes a plurality of first covering strips 221 disposed in correspondence with the plurality of first grooves 1121, and the first covering strips 221 are connected to the first covering body 210.

[0052] It can be understood that, the first grooves 1121 are disposed in an annular shape around the outer peripheral wall of the magnesium rod body 100, and the first covering strips 221 are filled within the first grooves 1121, and thus the first covering strips 221 are disposed in the annular shape. The plurality of first covering strips 221 are all connected to the first covering body 210. In this way, a strength of the covering member 200 is enhanced and in turn a stable support is provided for the magnesium rod body 100. Since the plurality of first grooves 1121 increases an surface area of the groove 112 and the plurality of first covering strips 221 are filled within the plurality of first grooves 1121, an area of the outer surface of the magnesium rod body 100 is reduced, and thus the corrosion rate of the magnesium rod body 100 is slowed down to achieve the effect of extending the service life of the magnesium rod body 100.

[0053] Upon the outer surface of the magnesium rod body 100 around the first covering strips 221 is consumed and corroded, the first grooves 1121 of the magnesium rod body 100 will increase, and the first covering strips 221 cannot cover a groove wall of the first grooves 1121 of the magnesium rod body 100 any more. At this time, the magnesium rod body 100 has performed the anti-corrosion protection on the inner tank for the water heater for a period of time. As the exposed surface area of the magnesium rod body 100 increases, the surface area of the magnesium rod body 100 in contact with water increases, and thus the magnesium rod body 100 is enabled to provide the stable and continuous anti-corrosion protection for the inner tank for the water heater.

[0054] Referring to FIG. 7 to FIG. 9, in an embodiment, the groove 112 further includes a second groove 1122 disposed on the outer peripheral wall of the magnesium rod body 100. The second groove 1122 is extending along the axial direction of the magnesium rod body 100 and in communication with the first groove 1121. The second covering body 220 also includes a second covering strip 222 disposed in correspondence with the second groove 1122. The second covering strip 222 is connected to the first covering strip 221.

[0055] It can be understood that there might be one or more second grooves 1122, and the number of second grooves 1122 is not limited here. The second groove 1122 is extending along the axial direction of the magnesium rod body 100, and the second covering strip 222 is filled within the second groove 1122, and therefore the second covering strip 222 is caused to extend along the axial direction of the magnesium rod body 100 and be disposed in an elongated strip shape. The second covering strip 222 is connected to the first covering strip 221, and the first covering strip 221 is connected to the first covering body 210. In this way, the strength of the covering member 200 is enhanced and in turn the stable support can be provided for the magnesium rod body 100 to prevent the magnesium rod body 100 from being easily broken after having been corroded for a period of time.

[0056] In some embodiments, the number of the second grooves 1122 may be multiple, that is, the number of the second covering strips 222 is multiple. The plurality of second grooves 1122 are arranged in sequence and at intervals on the outer peripheral wall of the magnesium rod body 100 along the circumferential direction of the magnesium rod body 100, and the second grooves 1122 are in communication with the plurality of first grooves 1121. In this way, the second covering strips 222 are caused to be connected to the plurality of first covering strips 221, and the plurality of second covering strips 222 are connected to the plurality of first covering strips 221 to form an annular grid structure, and thus an outer surface on the outer peripheral wall of the magnesium rod body 100 is divided into several blocks, which is beneficial to improving a uniformity of the magnesium rod body 100 corroded by water. Therefore the magnesium rod body 100 is prevented from being easily broken due to the corrosion on a concentrated position thereof, and thus a reliability of the magnesium rod assembly is improved.

[0057] Upon the outer surface of the magnesium rod body 100 around the second covering strip 222 is consumed and corroded, the second groove 1122 of the magnesium rod body 100 will increase, and the second covering strip 222

cannot cover a groove wall of the second groove 1122 of the magnesium rod body 100 any more. At this time, the magnesium rod body 100 has performed the anti-corrosion protection on the inner tank for the water heater for a period of time. As the exposed surface area of the magnesium rod body 100 increases, the surface area of the magnesium rod body 100 in contact with water increases, and thus the magnesium rod body 100 is enabled to provide the stable and continuous anti-corrosion protection for the inner tank for the water heater.

[0058] Referring to FIG. 10 to FIG. 12, in an embodiment, the groove 112 further includes a third groove 1123. The third groove 1123 is disposed in a spiral shape around the outer peripheral wall of the magnesium rod body 100 along the axial direction of the magnesium rod body 100, and the third groove 1123 is in communication with the cavity 111. The second covering body 220 also includes a third covering strip 223 disposed in correspondence with the third groove 1123, and the third covering strip 223 is disposed in a spiral shape and is connected to the first covering body 210.

[0059] It can be understood that the third groove 1123 is disposed in the spiral shape on the magnesium rod body 100. The third covering strip 223 is correspondingly filled within the third groove 1123, and is also disposed in the spiral shape. The third covering strip 223 is connected to the first covering body 210, and thus a strength of the covering member 200 is enhanced. Since the third covering strip 223 and the first covering body 210 both can support the magnesium rod body 100, the magnesium rod body 100 is prevented from being easily broken due to corrosion thereof for a period of time, and thus the reliability of corroded components is improved.

[0060] In an embodiment, the third groove 1123 is disposed in a spiral shape on the magnesium rod body 100, and the third covering strip 223 is filled within the third groove 1123, and thus the outer surface of the outer peripheral wall of the magnesium rod body 100 be evenly divided. This is beneficial to improving the uniformity of the magnesium rod body 100 corroded by water, and therefore the magnesium rod body 100 is prevented from being easily broken due to the corrosion on a concentrated position thereof, and thus a reliability of the magnesium rod assembly is improved.

[0061] Upon the outer surface of the magnesium rod body 100 around the third covering strip 223 is consumed and corroded, the third groove 1123 of the magnesium rod body 100 will increase, and the third covering strip 223 cannot cover a groove wall of the third groove 1123 of the magnesium rod body 100 any more. At this time, the magnesium rod body 100 has performed the anti-corrosion protection on the inner tank for the water heater for a period of time. As the exposed surface area of the magnesium rod body 100 increases, the surface area of the magnesium rod body 100 in contact with water increases, and thus the magnesium rod body 100 is enabled to provide the stable and continuous anti-corrosion protection for the inner tank for the water heater.

[0062] In an embodiment, the third groove 1123 is in communication with the first groove 1121, and the third covering strip 223 is connected to the first covering strip 221; and/or the third groove 1123 is in communication with the second groove 1122, and the third covering strip 223 is connected to the second covering strip 222. With such arrangement, it is beneficial to enhancing the strength of the covering member 200, and in turn the covering member 200 is enabled to provide a stable support for the magnesium rod body 100.

[0063] Referring to FIG. 1 to FIG. 3, in an embodiment, the recess 110 further includes a fourth groove 113 disposed on the magnesium rod body 100, and the fourth groove 113 is disposed on a side wall of the cavity 111. The covering member 200 further includes a fourth covering strip 230 disposed in correspondence with the fourth groove 113, and the fourth covering strip 230 is convexly disposed on an outer surface of the first cover body 210.

[0064] It can be understood that the fourth groove 113 passes through the magnesium rod body 100 along the radial direction of the magnesium rod body 100, and the fourth covering strip 230 is filled within the fourth groove 113. In this way, the surface area of the magnesium rod body 100 is further reduced, that is, the area of the magnesium rod body 100 in contact with water is further reduced, which is beneficial to slowing down the consumption rate of the magnesium rod body 100 to achieve the effect of extending the service life of the magnesium rod body 100.

[0065] In an embodiment, the fourth covering strip 230 is snapped within the fourth groove 113 on the side wall of the cavity 111, and the fourth covering strip 230 is convexly disposed on the outer surface of the first covering body 210, which is beneficial to improving a stability of the first covering body 210 in the cavity 111 of the magnesium rod body 100 and makes the first covering body 210 to be difficult to detach from the magnesium rod body 100.

[0066] Upon the outer surface of the magnesium rod body 100 around the fourth covering strip 230 is consumed and corroded, the fourth groove 113 of the magnesium rod body 100 will increase, and the fourth covering strip 230 cannot cover a groove wall of the fourth groove 113 of the magnesium rod body 100 any more. At this time, the magnesium rod body 100 has performed the anti-corrosion protection on the inner tank for the water heater for a period of time. As the exposed surface area of the magnesium rod body 100 increases, the surface area of the magnesium rod body 100 in contact with water increases, and thus the magnesium rod body 100 is enabled to provide the stable and continuous anti-corrosion protection for the inner tank for the water heater.

[0067] Referring to embodiments of FIG. 13 to FIG. 16, the recess 110 includes a plurality of first trenches 114, and the plurality of first trenches 114 are arranged in sequence and at intervals on the outer peripheral wall of the magnesium rod body 100 along the circumferential direction of the magnesium rod body 100. Each of the first trenches 114 is extending along the axial direction of the magnesium rod body 100. The covering member 200 includes a plurality of first covering segments 240 disposed in correspondence with the plurality of first trenches 114.

[0068] It can be understood that the plurality of first covering segments 240 are correspondingly filled within the plurality of first trenches 114. The area of the outer surface of the magnesium rod body 100 can be reduced by providing the first covering segments 240 which are filled within the first trenches 114, and thus it is conducive to reducing the area of the magnesium rod body 100 in contact with water, that is, it is conducive to reducing the reaction area of the magnesium rod body 100 in contact with water for ionization. Therefore, the consumption rate of the magnesium rod body 100 can be slowed down, to achieve the effect of extending the service life of the magnesium rod body 100.

[0069] Referring to embodiments of FIG. 16 to FIG. 19, the recess 110 further includes a plurality of second trenches 115, and the plurality of second trenches 115 are arranged in sequence and at intervals on the outer peripheral wall of the magnesium rod body 100 along the axial direction of the magnesium rod body 100. Each of the second trenches 115 is disposed in an annular shape along the circumferential direction of the magnesium rod body 100. The covering member 200 further includes a plurality of second covering segments 250 disposed in correspondence with the plurality of second trenches 115.

[0070] It can be understood that the second trenches 115 may be in communication with the first trenches 114. Correspondingly, the second covering segments 250 may be disposed in an annular shape and connected to the first covering segments 240. In other embodiments, the second trenches 115 may not be in communication with the first trenches 114, and the second covering segments 250 may also be disposed in an annular shape and spaced apart from the first covering segments 240. The specific way of disposition is not limited here.

[0071] In some embodiments, the second trenches 115 are disposed in an annular shape on the magnesium rod body 100, and the second covering segments 250 are disposed within the second trenches 115. The second covering segments 250 are also disposed in an annular shape. The second covering segments 250 are connected to a plurality of first covering segments 240, to make the covering member 200 to be formed as one integral structure, and thus a strength of the covering member 200 is enhanced. The second covering segments 250 and the first covering segments 240 each can support the magnesium rod body 100, and therefore the magnesium rod body 100 is prevented from being easily broken due to the corrosion thereof for a period of time, and in turn the reliability of corroded components is improved.

[0072] In an embodiment, the number of the first trenches 114 and the second trenches 115 are both multiple, and the plurality of second trenches 115 are arranged in sequence and at intervals on the outer peripheral wall of the magnesium rod body 100 along the axial direction of the magnesium rod body 100. The second trenches 115 are in communication with the plurality of first trenches 114. In this way the second covering segments 250 are caused to be connected to the plurality of first covering segments 240, and the plurality of first covering segments 240 and the plurality of second covering segments 250 are connected to form the annular grid structure, and thus the outer surface on the outer peripheral wall of the magnesium rod body 100 is divided into several blocks, which is beneficial to improving an uniformity of the magnesium rod body 100 corroded by water. Therefore the magnesium rod body 100 is prevented from being easily broken due to the corrosion on a concentrated position thereof, and in turn a reliability of the magnesium rod assembly is improved.

[0073] In an embodiment, a depth of the first trench 114 is less than or greater than a depth of the second trench 115. With such arrangement, a height difference between a bottom of the first trench 114 and a bottom of the second trench 115 is formed. When the magnesium rod body 100 is consumed to arrive at the first trench 114 and the second trench 115, at this time, the magnesium rod body 100 has performed the anti-corrosion protection on the inner tank for the water heater for a period of time. It is beneficial to increasing the surface area of the magnesium rod body 100 due to the difference in depth between the first trench 114 and the second trench 115. That is, at this time, the surface area of the magnesium rod body 100 that is in contact with water is large, and thus the magnesium rod body 100 is also enabled to provide the stable and continuous anti-corrosion protection for the inner tank for the water heater.

[0074] Referring to embodiments of FIG. 16 to FIG. 19, the magnesium rod body 100 has, along the axial direction thereof, a connecting end and a free end opposite to one another. The covering member 200 is attached to the free end of the magnesium rod body 100 to cover an outer surface of the free end of the magnesium rod body 100.

[0075] It can be understood that the connecting end of the magnesium rod body 100 is configured to connect to a conductive member, and the conductive member may be a screw. The screw is provided to facilitate the installation of the magnesium rod assembly within the inner tank for the water heater. The covering member 200 is attached to the free end of the magnesium rod body 100, that is, the covering member 200 can also cover an end of the magnesium rod body 100, and thus an surface area of the end of the magnesium rod body 100 in contact with water can be reduced, that is, the reaction area of the magnesium rod body 100 in contact with water for ionization can be reduced. Therefore it is beneficial to slowing down the corrosion rate of the magnesium rod body 100, that is, it is beneficial to slowing down the consumption rate during a period of the magnesium rod body 100 initially consumed, and in turn the effect of extending the service life of the magnesium rod body 100 can be achieved.

[0076] Referring to FIG. 21 to FIG. 24, in an embodiment, a concave hole 120 is disposed on a wall of the free end of the magnesium rod body 100. The covering member 200 includes a covering plate 260 and a covering column 270 disposed on a side of the covering plate 260. The covering column 270 is filled within the concave hole 120, and the covering plate 260 covers on the outer surface of the free end of the magnesium rod body 100.

[0077] It can be understood that the concave hole 120 is provided on a wall of the magnesium rod body 100, and thus a volume of the magnesium rod body 100 can be reduced, and in turn it is beneficial to slowing down a self-corrosion efficiency of the magnesium rod body 100. Upon an outer surface of the magnesium rod body 100 around the covering plate 260 is consumed and corroded, an outer surface of the magnesium rod body 100 around the covering column 270 will be consumed and corroded, to enlarge the concave hole 120. At this time, the covering column 270 cannot cover a groove wall of the concave hole 120 of the magnesium rod body 100 any more, and the magnesium rod body 100 has performed the anti-corrosion protection on the inner tank for the water heater for a period of time. As the magnesium rod body 100 at the concave hole 120 is consumed, an exposed surface area at the concave hole 120 of the magnesium rod body 100 increases, and the surface area of the magnesium rod body 100 in contact with water increases, and thus the magnesium rod body 100 is enabled to provide the stable and continuous anti-corrosion protection for the inner tank for the water heater.

[0078] In an embodiment, the covering plate 260 is connected to a plurality of first covering segments 240. With such arrangement, the plurality of first covering segments 240 are disposed on a same side of the covering plate 260, and the covering plate 260 and the plurality of first covering segments 240 form one integral body. In this way, it is beneficial to enhancing the strength of the covering member 200, and the covering member 200 is enabled to provide a stable support to the magnesium rod body 100. Therefore the magnesium rod body 100 is prevented from being easily broken due to the corrosion thereof for a period of time, and thus a reliability of corroded components is improved.

[0079] Referring to the embodiments of FIG. 18 to FIG 20, embodiments of FIG. 29 and FIG. 30, and the embodiments of FIG. 35, the magnesium rod assembly also includes a first conductive member 300, a resistance 400 and a second conductive member 500. The magnesium rod body 100 has, along the axial direction thereof, a connecting end and a free end opposite to one another. A portion of the first conductive member 300 is disposed within the connecting end, and another portion of the first conductive member 300 is disposed outside the connecting end. The magnesium rod body 100, the first conductive member 300, the resistance 400 and the second conductive member 500 are connected in sequence.

[0080] It can be understood that the magnesium rod body 100, the first conductive member 300, the resistance 400 and the second conductive member 500 are connected in sequence to form a series structure. With such arrangement, a resistance of the magnesium rod body 100 is increased, and therefore a current intensity of a reaction between the magnesium rod body 100 and corrosive ions in the water can be reduced, and in turn the corrosion rate of the magnesium rod body 100 is slowed down to achieve the effect of extending the service life of the magnesium rod body 100. A resistance value of the resistance may be set according to actual needs, and is not limited here. In an embodiment, the resistance value of the resistance is not less than 100 ohms and not greater than 200 ohms, for example 100 ohms, or 150 ohms, or 200 ohms and so on.

[0081] In an embodiment, the first conductive member 300 and the second conductive member 500 may both be screws. The screws are provided to facilitate an assembly and installation of the magnesium rod assembly within the inner tank for the water heater. In this way, it is beneficial to improving an installation efficiency of the magnesium rod assembly. In other embodiments, the first conductive member 300 and the second conductive member 500 may also be metal rods or other conductive rods, and are not limited here.

[0082] In an embodiment, an end of the resistance 400 may be wound around the first conductive member 300 through a first wire, and the first wire may be fixedly connected to the first conductive member 300 by a way of spot welding. Another end of the resistance 400 may be wound around the second conductive member 500 through a second wire, and the second wire may be fixedly connected to the second conductive member 500 by the way of spot welding. With such arrangement, the resistance 400 is enabled to be stably connected to the first conductive member 300 and the second conductive member 500, and therefore a reliability of the magnesium rod assembly is improved.

[0083] It can be understood that the first conductive member 300 and the second conductive member 500 may not be screws. In some embodiments, an end of the first conductive member 300 close to the resistance 400 is provided with a mounting portion for mounting the first wire. The mounting portion may be a convex portion, a concave portion, or a mounting hole and so on, which is not limited here, as long as the mounting portion can facilitate a connection between an end of the resistance 400 and the first conductive member 300. Correspondingly, an end of the second conductive member 500 close to the resistance 400 is also provided with a mounting portion for mounting the second wire. The mounting portion may be a convex portion, a concave portion, or a mounting hole and so on, which is not limited here, as long as the mounting portion can facilitate a connection between an end of the resistance 400 and the second conductive member 500.

[0084] In an embodiment, the first conductive member 300 and the second conductive member 500 are made of Q235A or 45# steel. With such arrangement, the first conductive member 300 and the second conductive member 500 have better conductivity.

[0085] Referring to the embodiments of FIG. 18 to FIG 20, the embodiments of FIG. 29 and FIG. 30, and the embodiments of FIG. 35, the magnesium rod assembly further includes a fixing member 600. The fixing member 600 is wrapped around outer surfaces of the another portion of the first conductive member 300, the resistance 400 and a portion of the

second conductive member 500, and another portion of the second conductive member 500 is disposed outside the fixing member 600.

[0086] It can be understood that the fixing member 600 is made of insulating materials, including but not limited to: silicone members, or plastic members and so on. The first conductive member 300, the resistance 400 and the second conductive member 500 are wrapped together using the fixing member 600, to cause that an end of the resistance 400 is not easily disconnected from the first conductive member 300 and/or the second conductive member 500, and therefore a stability of a connection between the resistance 400 and the magnesium rod body 100 is ensured, and in turn the resistance 400 is enabled to slow down the corrosion rate of the magnesium rod body 100, to achieve the effect of extending the service life of the magnesium rod body 100.

[0087] Referring to the embodiments of FIG. 28 to FIG. 30, as well as the embodiments of FIG. 34 and FIG. 35, the connecting end of the magnesium rod body 100 is provided with a lug boss 130, and a portion of the first conductive member 300 is disposed within the lug boss 130. The fixing member 600 is wrapped around an outer surface of the lug boss 130. With such arrangement, the magnesium rod body 100 and the fixing piece 600 are connected together, and it is conducive to improving a strength of a connection between the magnesium rod body 100 and the fixing piece 600 due to the lug boss 130, and in turn a stability of the connection between the resistance 400 and the magnesium rod body 100 is improved. Thus it is ensured that the resistance 400 can slow down the corrosion rate of the magnesium rod body 100, to achieve the effect of extending the service life of the magnesium rod body 100.

[0088] Referring to the embodiments of FIG. 18 to FIG. 20, the embodiments of FIG. 29 and FIG. 30, and the embodiment of FIG. 35, the fixing member 600 is an insulating member. The fixing member 600, the first conductive member 300, the resistance 400 and the second conductive member 500 are of an integrated structure. The fixing member 600, the first conductive member 300, the resistance 400 and the second conductive member 500 are connected by one-shot injection molding.

[0089] It can be understood that the fixing member 600 may be made of a plastic material. The first conductive member 300, the resistance 400 and the second conductive member 500 are wrapped together by the fixing member 600 through an injection molding process. An end of the second conductive member 500 is disposed outside of the fixing member 600 to facilitate an installation of the magnesium rod assembly on the inner tank for the water heater. With such arrangement, a stability of connections between the resistance 400 and the first conductive member 300 as well as the second conductive member 500 are ensured. The end of the resistance 400 is not easily disconnected from the first conductive member 300 and/or the second conductive member 500, to enable a stability of a connection and conduction between the resistance 400 and the magnesium rod body 100, and in turn enable the resistance 400 to slow down the corrosion rate of the magnesium rod body 100, to achieve the effect of extending the service life of the magnesium rod body 100.

[0090] Referring to the embodiments of FIG. 1 and FIG. 2, the embodiments of FIG. 4 and FIG. 5, the embodiments of FIG. 7 and FIG. 8, the embodiments of FIG. 10 and FIG. 11, the embodiments of FIG. 13 and FIG. 14, the embodiment of FIG. 15 and FIG. 16, the embodiment of FIG. 18 and FIG. 19, and the embodiment of FIG. 21 to FIG. 23, the covering member 200 is an insulating member, and an end of the covering member 200 is connected to an end of the fixing member 600. The covering member 200 and the fixing member 600 are integrally injection molded.

[0091] It can be understood that both the covering member 200 and the fixing member 600 may be plastic members, that is, both the covering member 200 and the fixing member 600 may be formed by the injection molding process. The covering member 200 and the fixing member 600 may be integrally injection molded or may also be separately injection molded. In some embodiments, the covering member 200 and the fixing member 600 are formed by an integral injection molding. In this way, a manufacturing process of the magnesium rod assembly is simplified, and it facilitates to saving of manufacturing time and production cost of the magnesium rod assembly.

[0092] Referring to the embodiments of FIG. 25 to FIG. 27 and the embodiments of FIG. 32 and FIG. 33, the covering member 200 is detachably disposed on the magnesium rod body 100. It can be understood that the covering member 200 is detachably connected to the magnesium rod body 100. The magnesium rod body 100 is a consumable member, but the covering member 200 is not a consumable member. After the magnesium rod body 100 is replaced, the covering member 200 can continue to be fitted with the magnesium rod body 100 for using, and thus it is beneficial to reducing after-sales maintenance costs, and in turn an applicability of the covering member 200 is improved.

[0093] Referring to the embodiment of FIG. 26 and the embodiment of FIG. 33, the covering member 200 is in a form of an annular grid structure. With this arrangement, when the covering member 200 is disposed on the magnesium rod body 100 and covers a portion of an outer surface of the magnesium rod body 100, the covering member 200 divides the outer surface of the magnesium rod body 100 into a plurality of blocks. Thus, it is beneficial to improving the uniformity of the magnesium rod body 100 corroded by water. Therefore the magnesium rod body 100 is prevented from being easily broken due to the corrosion on a concentrated position thereof, and thus a reliability of the magnesium rod assembly is improved.

[0094] Referring to FIG. 26 and FIG. 31, in an embodiment, the covering member 200 is made of a silicone material. The covering member 200 is sleeved on the magnesium rod body 100 and attached within the recess 110. It can be understood that the covering member 200 is made of the silicone material to cause the covering member 200 to have

a certain shrinkage elasticity. When the covering member 200 is sleeved on the magnesium rod body 100, the covering member 200 can be attached onto a bottom wall of the recess 110 of the magnesium rod body 100, and be not easily detached from the recess 110 of the magnesium rod body 100, and thus the covering member 200 can stably cover a portion of the outer surface of the magnesium rod body 100 to reduce the area of the outer surface of the magnesium rod body 100. In this way, it is conducive to reducing the area of the magnesium rod body 100 in contact with water, and thus the consumption rate of the magnesium rod body 100 is enabled to be slowed down to achieve the effect of extending the service life of the magnesium rod body 100, and in turn the service life of the water heater is extended and after-sales repair costs for the water heater are reduced.

[0095] Referring to FIG. 33, in an embodiment, the covering member 200 includes a first insulation bracket 201 and a second insulation bracket 202. An annular grid structure is enclosed by the first insulation bracket 201 and the second insulation bracket 202. The first insulation bracket 201 and the second insulation bracket 202 are detachably connected. The first insulation bracket 201 is attached within a portion of the recess 110 and the second insulation bracket 202 is attached within another portion of the recess 110 to cover a portion of the outer surface of the magnesium rod body 100.

[0096] It can be understood that the first insulation bracket 201 and the second insulation bracket 202 each can be made of plastic materials. In other embodiments, the first insulation bracket 201 and the second insulation bracket 202 each can also be made of other insulating materials, for example ceramics and other materials, which are not limited here. As for the annular grid structure enclosed by the first insulation bracket 201 and the second insulation bracket 202, the first insulation bracket 201 and the second insulation bracket 202 themselves may have a grid structure, or the grid structure is enclosed by the first insulation bracket 201 and the second insulation bracket. The specific way of enclosure is not limited here, as long as an annular structure is enclosed by the first insulation bracket 201 and the second insulation bracket 202.

[0097] In an embodiment, the first insulation bracket 201 and the second insulation bracket 202 may be detachably connected in a variety of ways. In some embodiments, the first insulation bracket 201 and the second insulation bracket 202 may be detachably connected using a buckle structure. In other embodiments, the first insulation bracket 201 and the second insulation bracket 202 may be detachably connected using a bolt structure. The specific way of connection of these two insulation brackets is not limited here. The first insulation bracket 201 is attached within the portion of the recess 110 to cover a bottom wall of the portion of the recess 110. The second insulation bracket 202 is attached within the another portion of the recess 110 to cover a bottom wall of the another portion of the recess 110. An opening of the first insulation bracket 201 is disposed opposite to an opening of the second insulation bracket 202, to enable the first insulation bracket 201 and the second insulation bracket 202 to be enclosed to form the annular structure and be attached within the recess 110 of the magnesium rod body 100. With such arrangement, the first insulation bracket 201 and the second insulation bracket 202 are ensured to cooperate with one another to reduce the area of the outer surface of the magnesium rod body 100, and thus the area of the magnesium rod body 100 in contact with water is reduced. In this way, it is beneficial to slowing down the consumption rate of the magnesium rod body 100, to achieve the effect of extending the service life of the magnesium rod body 100.

[0098] Referring to the embodiments of FIG. 36 to FIG. 38, the embodiments of FIG. 39 to FIG. 41, and the embodiments of FIG. 42 to FIG. 44, the first insulation bracket 201 and the second insulation bracket 202 are snap-connected. With such arrangement, the first insulation bracket 201 and the second insulation bracket 202 are caused to be easy to disassemble and assemble, and in turn an assembly efficiency of the magnesium rod assembly can be improved.

[0099] Referring to the embodiment of FIG. 36 and FIG. 37, the first insulation bracket 201 has a first side end and a second side end disposed opposite to one another in a radial direction of the covering member 200. The second insulation bracket 202 has a third side end disposed in correspondence with the first side end, and a fourth side end disposed in correspondence with the second side end. Hooks 203 are disposed on the first side end and the second side end, and slots 204 are disposed on the third side end and the fourth side end. The hooks 203 are snap fit with the slots 204. In other embodiment, the hooks 203 are disposed on the first side end and the fourth side end, and the slots 204 are disposed on the second side end and the third side end, and thus the hooks 203 are snap fit with the slots 204.

[0100] In an embodiment, hooks 203 are disposed on the first side end and second side end, and slots 204 are disposed on the third side end and fourth side end. That is, both opposite ends of the first insulation bracket 201 are disposed with hooks 203, and both opposite ends of the second insulation bracket 202 are disposed with slots 204. The hooks 203 of the first insulation bracket 201 are snapped within the slots 204 of the second insulation bracket 202.

[0101] In another embodiment, the hooks 203 are disposed on the first side end and the fourth side end, and the slots 204 are disposed on the second side end and the third side end. That is, an end of the first insulation bracket 201 is disposed with the hook 203 and another end of the first insulation bracket 201 is disposed with the slot 204. Correspondingly, an end of the second insulation bracket 202 is disposed with the slot 204 and another end of the second insulation bracket 202 is disposed with a hook 203. The hooks 203 and the slots 204 on the first insulation bracket 201 and the second insulation bracket 202 are snap fit with one another.

[0102] It can be understood that the number of hooks 203 and slots 204 on the first insulation bracket 201 and the second insulation bracket 202 is not limited, and may be set according to lengths and specific needs of the first insulation

bracket 201 and the second insulation bracket 202. Through such structure of the hook 203 and the slot 204, the first insulation bracket 201 and the second insulation bracket 202 are easy to manufacture, assemble and disassemble, and thus it is beneficial to improving the applicability of the covering member 200.

[0103] Referring to the embodiments of FIG. 39 to FIG. 41 and the embodiments of FIG. 42 to FIG. 44, the first insulation bracket 201 and the second insulation bracket 202 each include two first rod bodies 205 and a plurality of second rod bodies 206. The two first rod bodies 205 are arranged at an interval and extending along an axial direction of the covering member 200. The second rod bodies 206 are disposed between the two first rod bodies 205. Two ends of the second rod bodies 206 are connected to the two first rod bodies 205, respectively. The plurality of second rod bodies 206 are arranged in sequence and at intervals on the first rod bodies 205 along the axial direction of the covering member 200. Two ends of each of the second rod body 206 are provided with the hook 203 and/or the slot 204, wherein the two ends being opposite to one another along a radial direction of the covering member 200.

[0104] It can be understood that the number of the first rod bodies 205 may also be multiple. A plurality of first rod bodies 205 are arranged in sequence and at intervals and extending along the axial direction of the covering member 200 respectively. The second rod bodies 206 are connected to the plurality of first rod bodies 205 along the radial direction of the covering member 200. The plurality of second rod bodies 206 are disposed in sequence and at intervals along the axial direction of the covering member 200. With such arrangement, the first insulation bracket 201 and the second insulation bracket 202 each are enabled to be in a grid shape. In some embodiments, the number of the first rod bodies 205 is two. In other embodiments, the number of the first rod bodies 205 may be three, or five and so on.

[0105] In an embodiment, considering that an outer contour of the magnesium rod body 100 is disposed in a cylindrical shape, the outer contour of the covering member 200 is also disposed in a cylindrical shape. Therefore, in this embodiment, the first rod bodies 205 are disposed in a straight line along a length direction thereof, and in an arc shape along a width direction thereof; the second rod bodies 206 are disposed in an arc shape along a length direction thereof; and a curvature of the first rod bodies 205 and a curvature of the second rod bodies 206 are adapted to a curvature of the outer peripheral wall of the magnesium rod body 100. With such arrangement, it is ensured that the covering member 200 formed after the first insulation bracket 201 and the second insulation bracket 202 are assembled can be attached within the recess 110, and an outer surface of the covering member 200 does not exceed the outer surface of the magnesium rod body 100, to enable the covering member 200 not to change an overall dimension of the magnesium rod body 100, and therefore an assembling of the magnesium rod body 100 and the inner tank for the water heater may not be affected.

[0106] Referring to the embodiments of FIG. 39 to FIG. 41 and the embodiments of FIG. 42 to FIG. 44, the first insulation bracket 201 and the second insulation bracket 202 are centrosymmetrically disposed along an axial direction relative to a center of the covering member 200. With such arrangement, structures of the first insulation bracket 201 and the second insulation bracket 202 can be exactly the same. When the first insulation bracket 201 and the second insulation bracket 202 are manufactured, it is only required to manufacture one of the first insulation bracket 201 and the second insulation bracket 202. When the first insulation bracket 201 and the second insulation bracket 202 are assembled, an assembly misalignment can also be avoided, and thus a reliability of the covering member 200 is improved.

[0107] The present disclosure also proposes a magnesium rod assembly, which is for an inner tank for a water heater. The magnesium rod assembly includes a magnesium rod body 100 and a covering member 200. The magnesium rod body is made of a rare earth-magnesium alloy material, and the covering member 200 is disposed on the magnesium rod body 100 and covers a portion of an outer surface of the magnesium rod body 100.

[0108] It can be understood that a magnesium alloy material may contain impurity elements including at least one of Si, Fe, Cu or Ni. The impurity elements are inevitable or difficult to avoid during a preparation process of the magnesium alloy material. In some embodiments, the magnesium rod body 100 is made of the rare earth-magnesium alloy material. The rare earth-magnesium alloy material contains a magnesium alloy and rare earth elements. A content of the impurity elements in the rare earth-magnesium alloy material is reduced by adding the rare earth elements to the magnesium alloy, to reduce a corrosion of the magnesium alloy by the impurity elements, and cause the magnesium rod body made of the rare earth-magnesium alloy materials to have a high current efficiency, and therefore problems of excessive corrosion rate and an obvious particle-shed surface of existing magnesium rods when used are solved, and in turn a service life and a safety of use of the magnesium rod body are improved.

[0109] In an embodiment, the rare earth-magnesium alloy material includes 0.0009-3.5% rare earth elements by mass percentage, and the rare earth elements are a Ce-containing cerium group rare earth elements. It can be understood that in a process of using a material of magnesium alloy as a sacrificial anode material, a self-corrosion will incur on the magnesium alloy due to an existence of a cathode phase $\text{Mg}_{17}\text{Al}_{12}$ (β phase) in a multi-phase structure of the magnesium alloy. In some embodiments, a content of the β phase ($\text{Mg}_{17}\text{Al}_{12}$) when the magnesium alloy is used as a sacrificial anode is reduced by adding an appropriate amount of the cerium group rare earth elements containing Ce, to reduce a degree of the self-corrosion of the sacrificial anode of the magnesium alloy, and also improve a distribution uniformity of the β phase ($\text{Mg}_{17}\text{Al}_{12}$) in a structure of the sacrificial anode of the magnesium alloy.

[0110] In an embodiment, when the magnesium rod assembly is disposed in an inner tank for a water heater for performing an anti-corrosion protection to the inner tank for the water heater, since the covering member 200 covers a

portion of an outer surface of the magnesium rod body 100, the covering member 200 can isolate water from the portion of the outer surface of the magnesium rod body 100 as the magnesium rod assembly is preliminarily consumed, that is, the covering member 200 reduces a surface area of the magnesium rod body 100 in contact with water, that is, a reaction area of the magnesium rod body 100 in contact with water for ionization is reduced. Therefore, a consumption rate of the magnesium rod body 100 can be slowed down, to achieve an effect of extending a service life of the magnesium rod body 100. It can be seen that the magnesium rod assembly of the present disclosure can solve a problem of short service life of the magnesium rods in the prior art.

[0111] It can be understood that the only difference between the magnesium rod assembly of this embodiment and the magnesium rod assembly of the aforementioned embodiments is in that the magnesium rod body of this embodiment is made of the rare earth-magnesium alloy material, while the magnesium rod body of the aforementioned embodiments is made of the magnesium alloy material. That is to say, in addition to the above-mentioned distinguishing features of the magnesium rod assembly of this embodiment, the magnesium rod assembly of this embodiment can adopt all the technical solutions of all the embodiments of the aforementioned magnesium rod assembly. This embodiment has all the functions brought by the technical solution of the embodiments of the aforementioned magnesium rod assembly, and thus details will not be repeated here.

[0112] The present disclosure also proposes an inner tank for a water heater. The inner tank for the water heater includes the magnesium rod assembly as described above. The specific structure of the magnesium rod assembly may refer to the above embodiments. Since this inner tank for the water heater adopts all the technical solutions of all the above embodiments, this inner tank for the water heater has at least all the functions brought by the technical solutions of the above embodiments, and thus details will not be repeated here.

[0113] The present disclosure also proposes a water heater. The water heater includes the inner tank for the water heater as described above. The specific structure of the inner tank for the water heater may refer to the above embodiments. Since this inner tank for the water heater adopts all the technical solutions of all the above embodiments, this inner tank for the water heater has at least all the functions brought by the technical solutions of the above embodiments, and thus details will not be repeated here.

[0114] The above are only optional embodiments of the present disclosure, and are not intended to limit the patent scope of the present disclosure. Under the inventive concept of the present disclosure, any equivalent structural transformation made by using the contents of the description and accompanying drawings of the present disclosure, or direct/indirect applications in other related technical fields are both included within the protection scope sought for by the present disclosure.

Claims

1. A magnesium rod assembly for an inner tank for a water heater, comprising:

a magnesium rod body; and
a covering member, disposed on the magnesium rod body and covering a portion of an outer surface of the magnesium rod body.

2. The magnesium rod assembly according to claim 1, wherein the outer surface of the magnesium rod body is provided with a recess, and wherein the covering member is disposed in the recess to cover the portion of the outer surface of the magnesium rod body.

3. The magnesium rod assembly according to claim 2, wherein the magnesium rod body has, along an axial direction thereof, a connecting end and a free end opposite to one another, and wherein the covering member is attached to the free end of the magnesium rod body to cover an outer surface of the free end of the magnesium rod body.

4. The magnesium rod assembly according to claim 2, wherein the recess comprises a cavity extending along the axial direction of the magnesium rod body, the cavity passing through the magnesium rod body along a radial direction of the magnesium rod body; and wherein the covering member comprises a first covering body in the cavity.

5. The magnesium rod assembly according to claim 2 or 4, wherein the recess further comprises a groove disposed on an outer peripheral wall of the magnesium rod body, the groove being in communication with the cavity; and wherein the covering member further comprises a second covering body in the groove, the second covering body being connected to the first covering body.

6. The magnesium rod assembly according to claim 5, wherein the groove comprises a plurality of first grooves, the

plurality of first grooves being arranged in sequence and at intervals on the outer peripheral wall of the magnesium rod body along the axial direction of the magnesium rod body, each of the first grooves being disposed in an annular shape along a circumferential direction of the magnesium rod body and in communication with the cavity; and the second covering body comprises a plurality of first covering strips disposed in correspondence with the plurality of first grooves, the first covering strips being connected to the first covering body.

7. The magnesium rod assembly according to claim 6, wherein the groove further comprises a second groove disposed on the outer peripheral wall of the magnesium rod body, the second groove extending along the axial direction of the magnesium rod body and being in communication with the first groove; and the second covering body further comprises a second covering strip disposed in correspondence with the second groove, the second covering strip being connected to the first covering strip.

8. The magnesium rod assembly according to claim 6, wherein the groove further comprises a third groove, the third groove being disposed in a spiral shape around the outer peripheral wall of the magnesium rod body along the axial direction of the magnesium rod body; and the second covering body further comprises a third covering strip disposed in correspondence with the third groove, the third covering strip being disposed in a spiral shape.

9. The magnesium rod assembly according to claim 4, wherein the recess further comprises a fourth groove disposed on the magnesium rod body, the fourth groove being disposed on a side wall of the cavity; and the covering member further comprises a fourth covering strip disposed in correspondence with the fourth groove, the fourth covering strip being convexly disposed on an outer surface of the first cover body.

10. The magnesium rod assembly according to any one of claims 2 to 9, wherein the recess comprises a plurality of first trenches, the plurality of first trenches being arranged in sequence and at intervals on the outer peripheral wall of the magnesium rod body along the circumferential direction of the magnesium rod body, each of the first trenches extending along the axial direction of the magnesium rod body; and the covering member comprises a plurality of first covering segments disposed in correspondence with the plurality of first trenches.

11. The magnesium rod assembly according to any one of claims 2 to 9, wherein the recess further comprises a plurality of second trenches, the plurality of second trenches being arranged in sequence and at intervals on the outer peripheral wall of the magnesium rod body along the axial direction of the magnesium rod body, each of the second trenches being disposed in an annular shape along the circumferential direction of the magnesium rod body and in communication with the first trench; and the covering member further comprises a plurality of second covering segments disposed corresponding to the plurality of second trenches, the second covering segments being disposed in an annular shape and connected to the first covering segments.

12. The magnesium rod assembly according to claim 3, wherein a concave hole is disposed on a wall of the free end of the magnesium rod body, and wherein the covering member comprises a covering plate and a covering column disposed on a side of the covering plate, the covering column being provided within the concave hole, the covering plate covering an outer surface of the free end of the magnesium rod body.

13. The magnesium rod assembly according to any one of claims 1 to 12, wherein the magnesium rod assembly further comprises a first conductive member, a resistance and a second conductive member, wherein,

the magnesium rod body has, along the axial direction thereof, a connecting end and a free end opposite to one another;

a portion of the first conductive member is disposed within the connecting end;

another portion of the first conductive member is disposed outside the connecting end; and

the magnesium rod body, the first conductive member, the resistance and the second conductive member are connected in sequence.

14. The magnesium rod assembly according to claim 13, wherein the magnesium rod assembly further comprises a fixing member, and wherein the fixing member is wrapped around outer surfaces of the another portion of the first conductive member, the resistance and a portion of the second conductive member, another portion of the second conductive member being disposed outside the fixing member; and/or,

the connecting end of the magnesium rod body is provided with a lug boss, and wherein the portion of the first conductive member is disposed within the lug boss, and wherein the fixing member is wrapped around an outer surface of the lug boss.

5 15. The magnesium rod assembly according to claim 14, wherein the fixing member is an insulating member, and wherein the fixing member, the first conductive member, the resistance and the second conductive member are of an integrated structure, and wherein the fixing member, the first conductive member, the resistance and the second conductive member are connected by one-shot injection molding; and/or
10 the covering member is an insulating member, an end of the covering member being connected to an end of the fixing member, the covering member and the fixing member being integrally injection molded.

16. The magnesium rod assembly according to any one of claims 1 to 15, wherein the covering member is detachably disposed on the magnesium rod body; and/or,
15 the covering member is in a form of an annular grid structure.

17. The magnesium rod assembly according to claim 16, wherein the covering member is made of a silicone material, and is sleeved on the magnesium rod body and attached within the recess; or
the covering member comprises a first insulation bracket and a second insulation bracket, and wherein an annular grid structure is enclosed by the first insulation bracket and the second insulation bracket; the first insulation bracket and the second insulation bracket are detachably connected; and the first insulation bracket is attached within a
20 portion of the recess, and the second insulation bracket is attached within another portion of the recess, to cover the portion of the outer surface of the magnesium rod body.

18. The magnesium rod assembly according to claim 17, wherein the first insulation bracket and the second insulation bracket are snap-connected.
25

19. The magnesium rod assembly according to claim 17 or 18, wherein the first insulation bracket has a first side end and a second side end disposed opposite to one another in a radial direction of the covering member, and wherein the second insulation bracket has a third side end disposed in correspondence with the first side end and a fourth side end disposed in correspondence with the second side end; and wherein a hook is respectively disposed on the first side end and the second side end, and wherein a slot is respectively disposed on the third side end and the fourth side end, the hook being snap-fit with the slot; or
30 a hook is respectively disposed on the first side end and the fourth side end, and wherein a slot is respectively disposed on the second side end and the third side end, the hook being snap-fit with the slot.
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20. The magnesium rod assembly according to claim 19, wherein each of the first insulation bracket and the second insulation bracket comprises two first rod bodies and a plurality of second rod bodies;

the two first rod bodies are arranged at an interval and extending along an axial direction of the covering member; the second rod body is disposed between the two first rod bodies;

two ends of the second rod body are respectively connected to the two first rod bodies;

the plurality of second rod bodies are arranged in sequence and at intervals on the first rod bodies along the axial direction of the covering member; and

two ends of each of the second rod body are provided with the hook and/or the slot, wherein the two ends being opposite to one another along a radial direction of the covering member.
45

21. A magnesium rod assembly for an inner tank for a water heater, comprising:

a magnesium rod body, made of a rare earth-magnesium alloy material, the rare earth element in the rare earth magnesium alloy material being a Ce-containing cerium group rare earth element; and

a covering member, disposed on the magnesium rod body and covering a portion of an outer surface of the magnesium rod body.
50

22. The magnesium rod assembly according to any one of claims 1 to 21, wherein the magnesium rod assembly further comprises a first conductive member, a resistance and a second conductive member, and wherein,
55

the magnesium rod body has, along the axial direction thereof, a connecting end and a free end opposite to one another;

a portion of the first conductive member is disposed within the connecting end;
another portion of the first conductive member is disposed outside the connecting end; and
the magnesium rod body, the first conductive member, the resistance and the second conductive member are
connected in sequence.

- 5
- 23.** The magnesium rod assembly according to any one of claims 1 to 21, wherein the covering member is detachably disposed on the magnesium rod body.
- 10
- 24.** An inner tank for a water heater, comprising a magnesium rod assembly according to any one of claims 1 to 23.
- 25.** A water heater, comprising an inner tank for a water heater according to claim 24.
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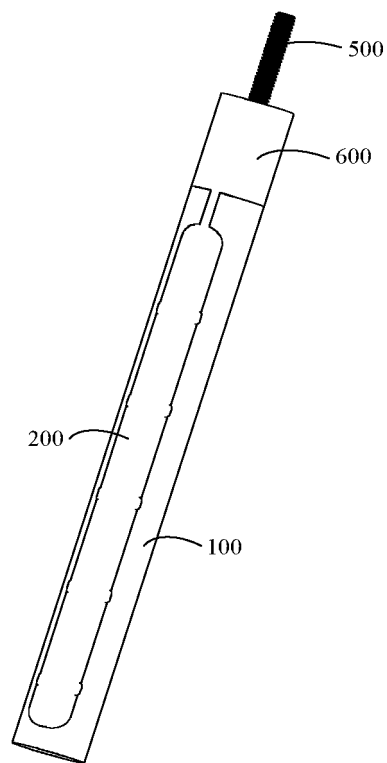


FIG. 1

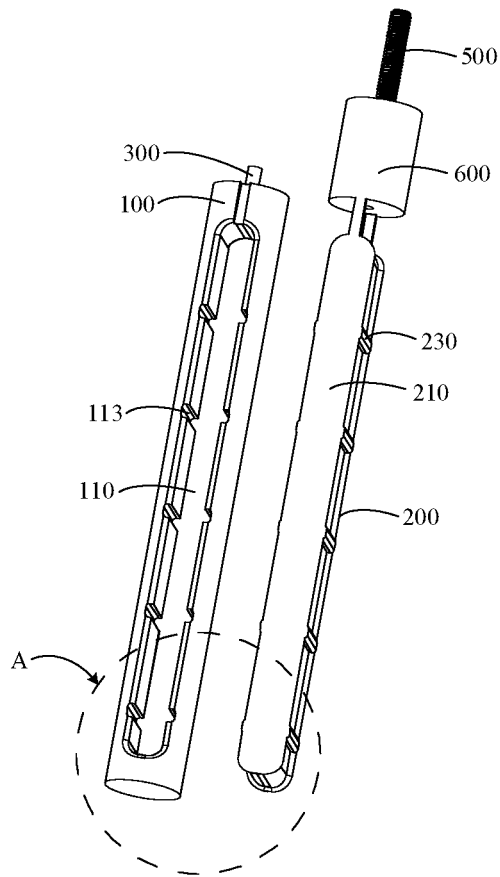


FIG. 2

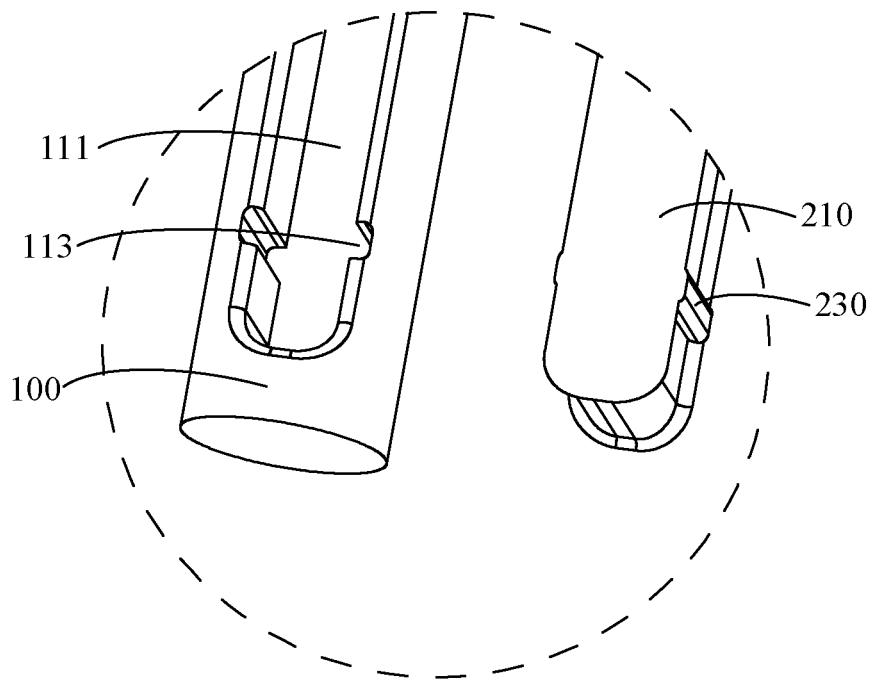


FIG. 3

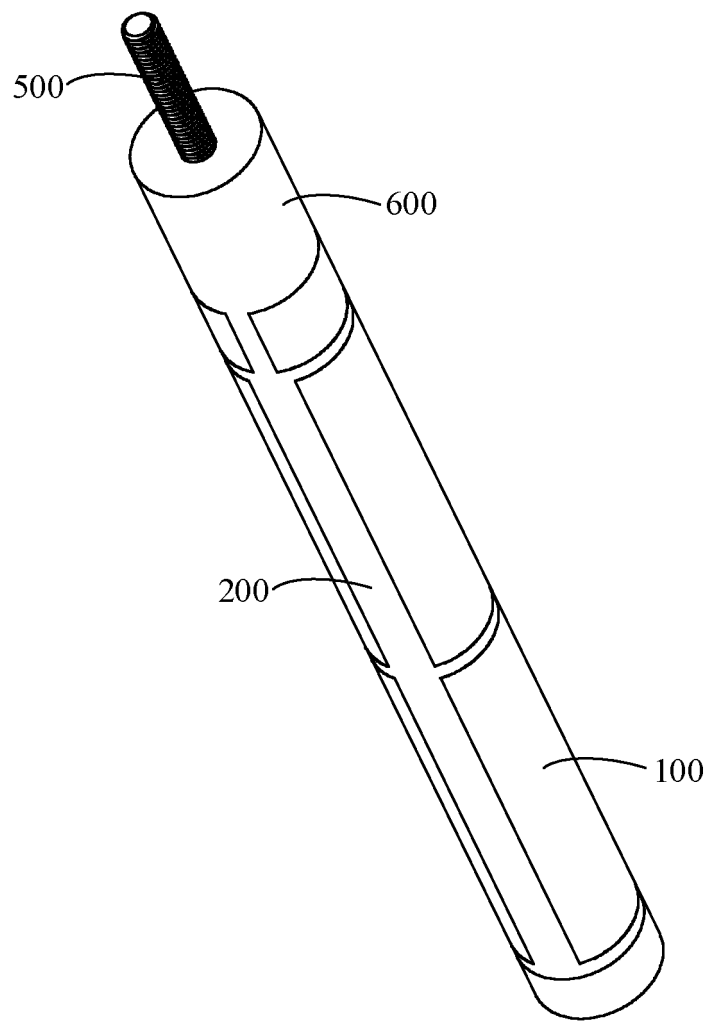


FIG. 4

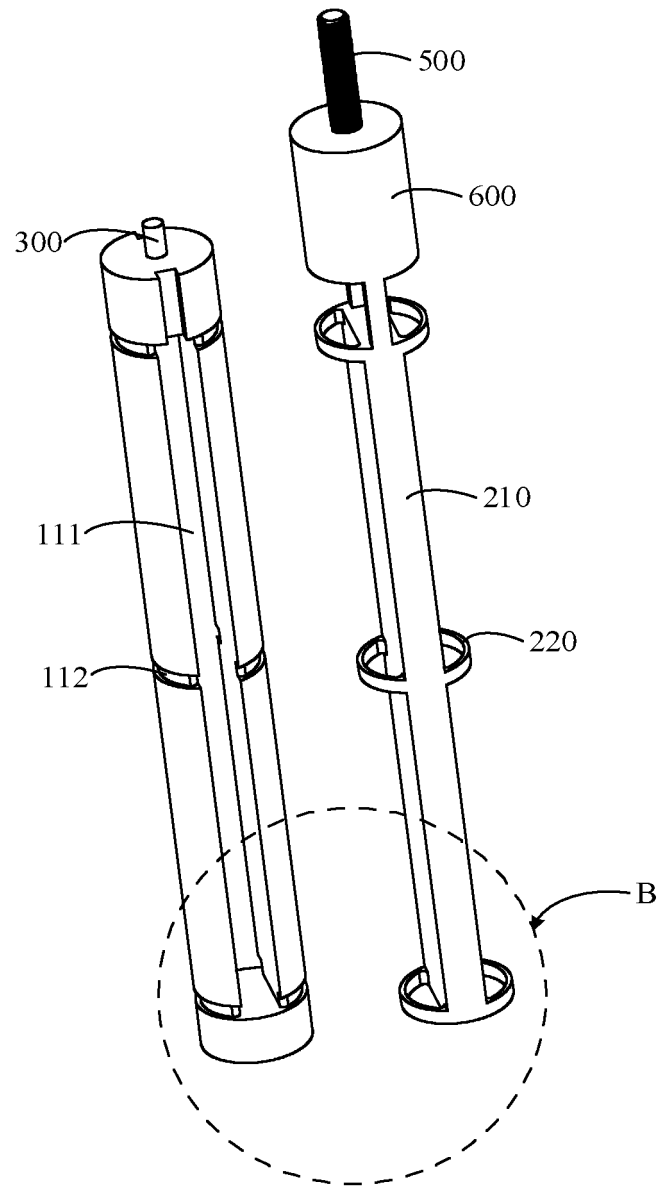


FIG. 5

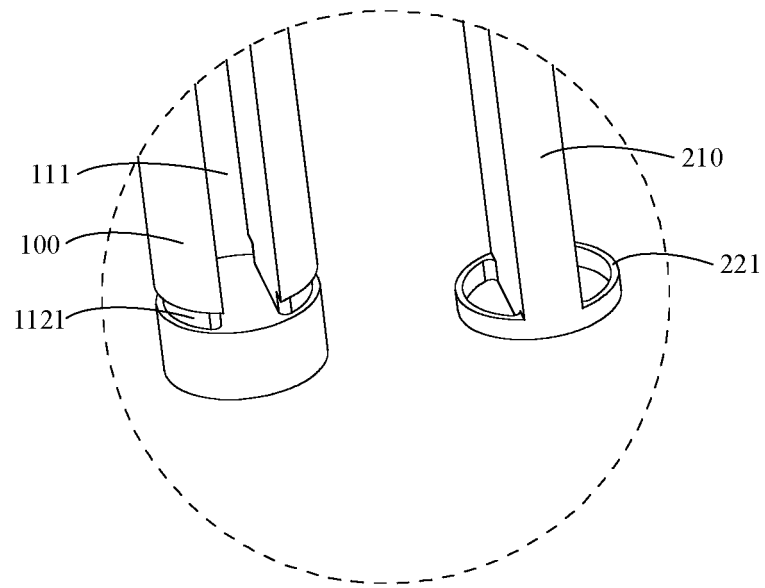


FIG. 6

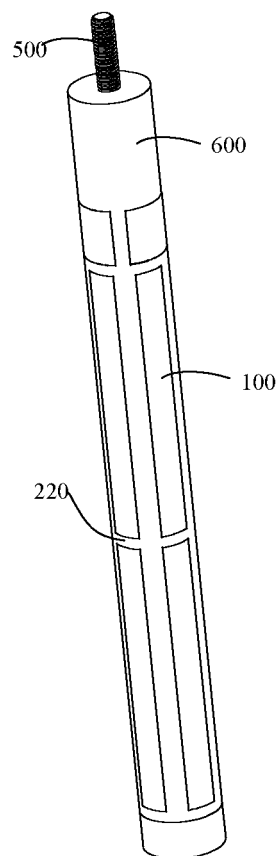


FIG. 7

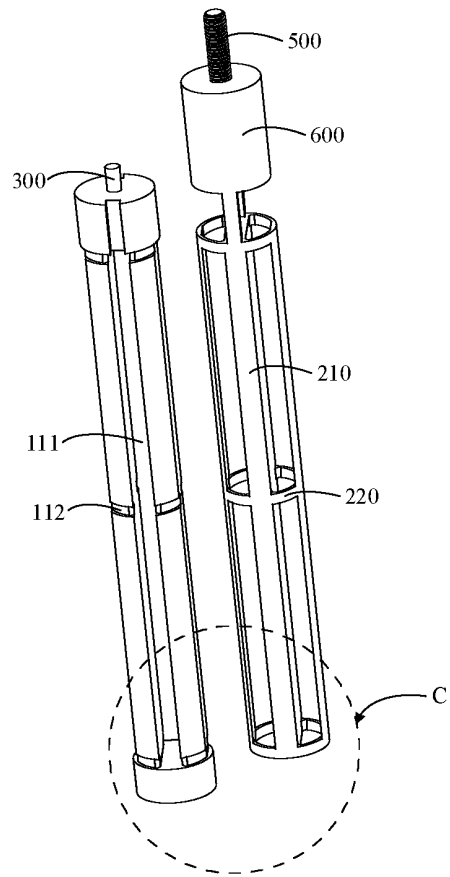


FIG. 8

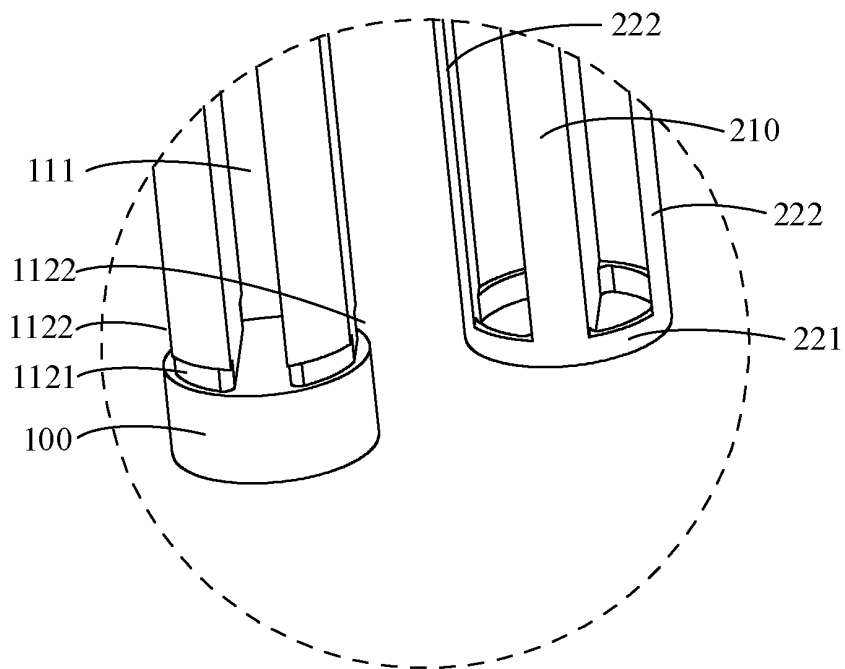


FIG. 9

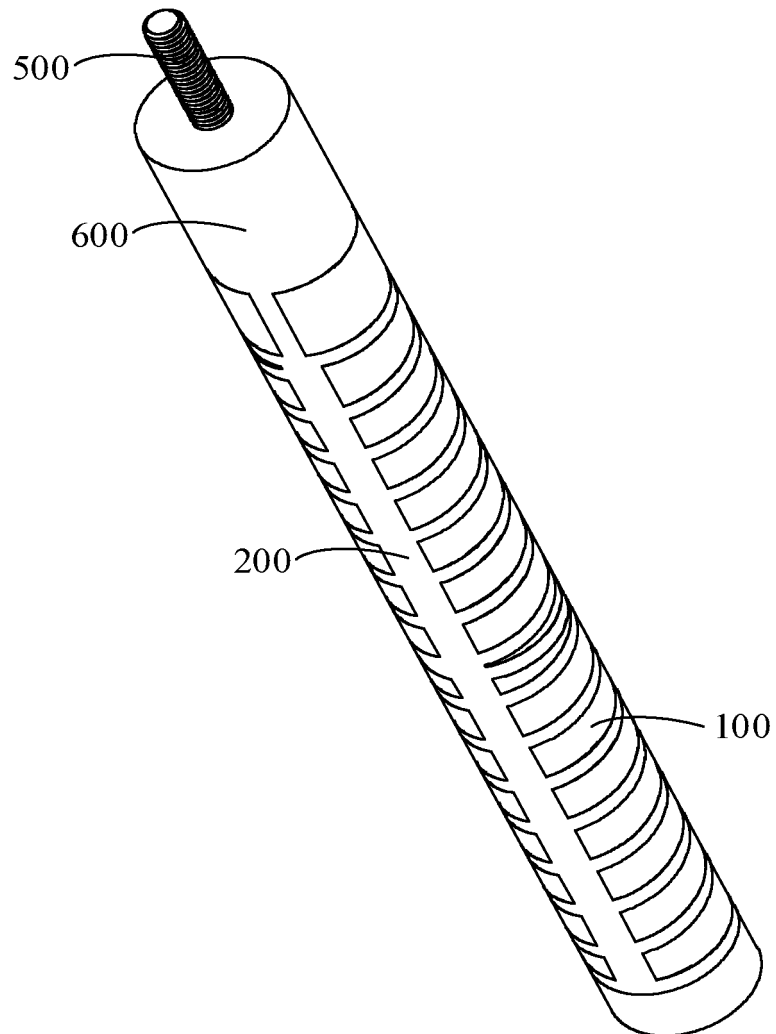


FIG. 10

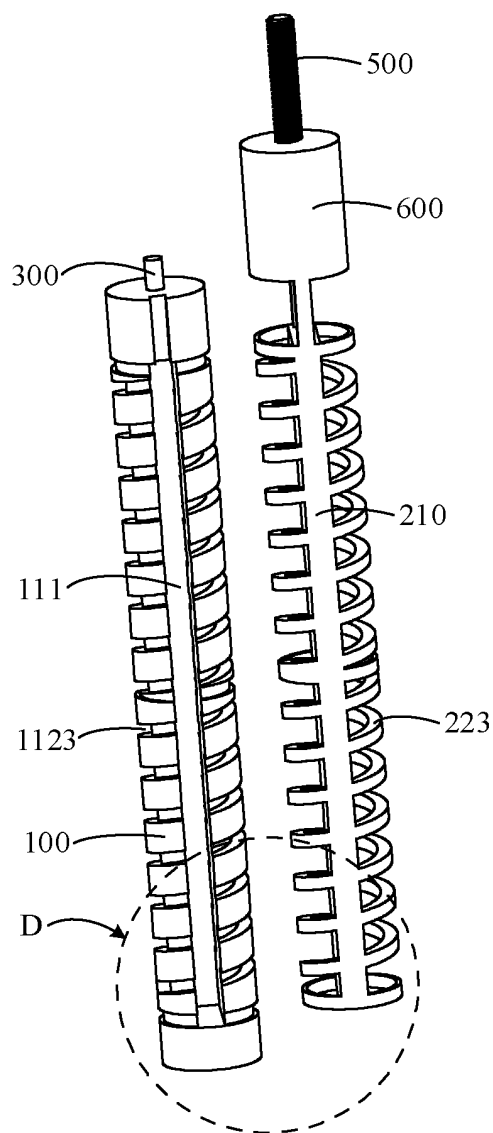


FIG. 11

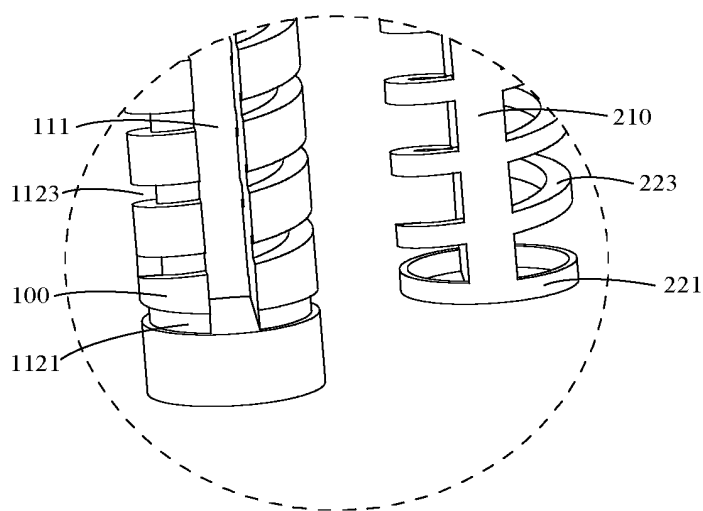


FIG. 12

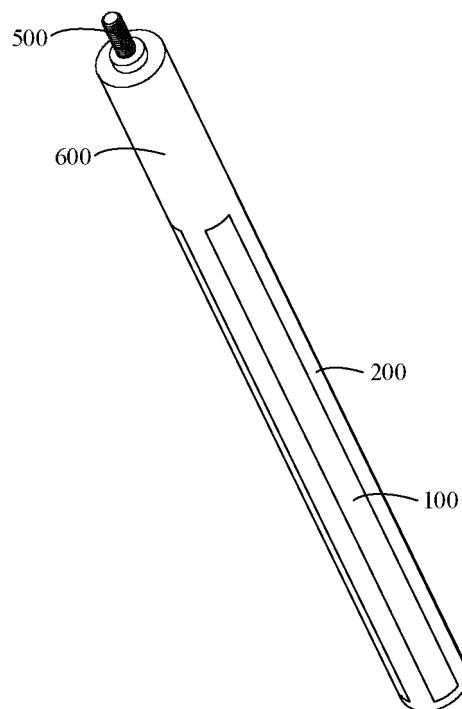


FIG. 13

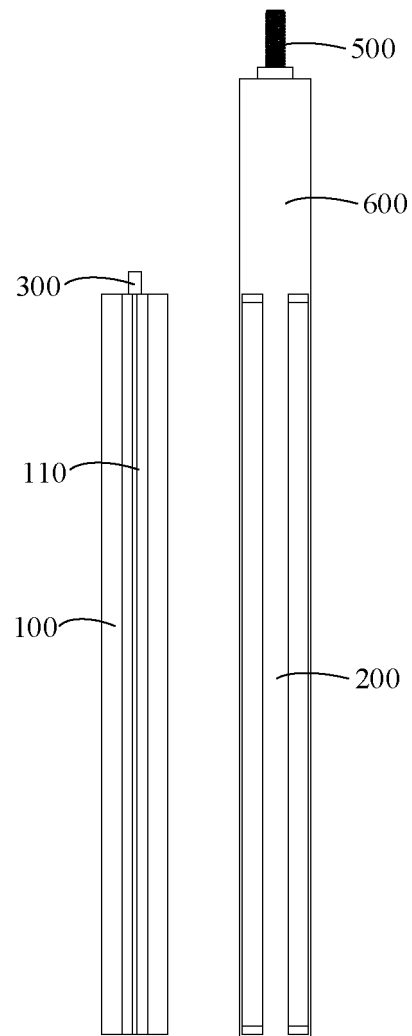


FIG. 14

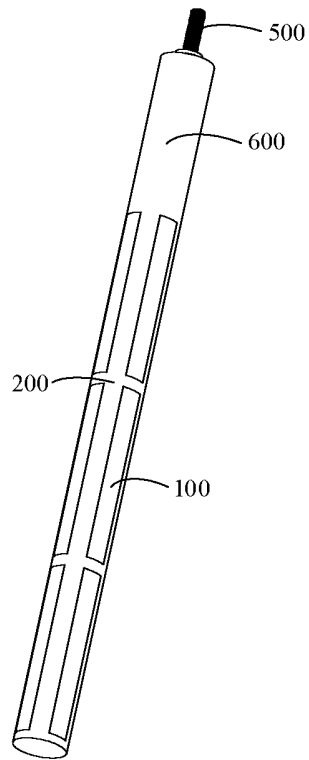


FIG. 15

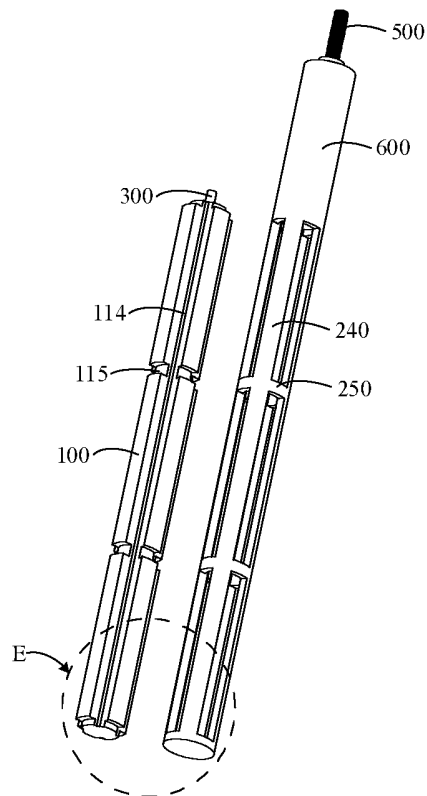


FIG. 16

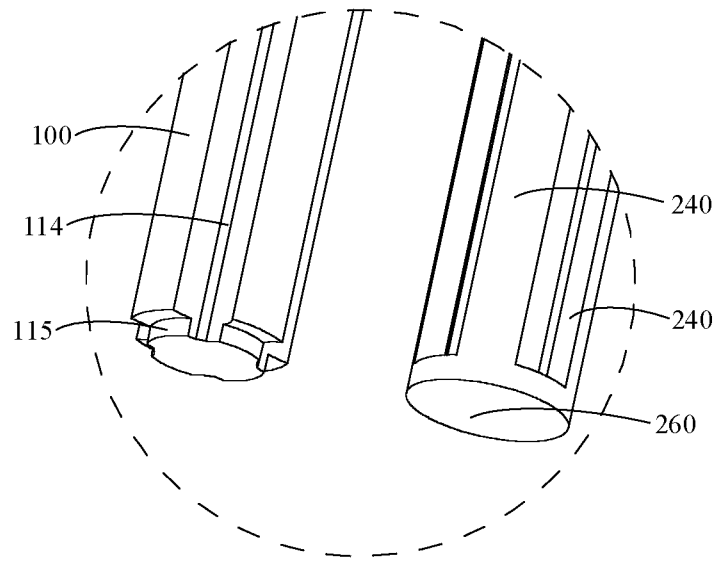


FIG. 17

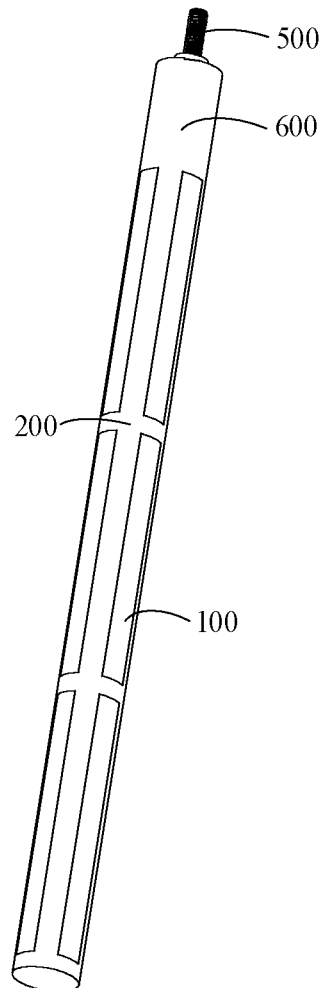


FIG. 18

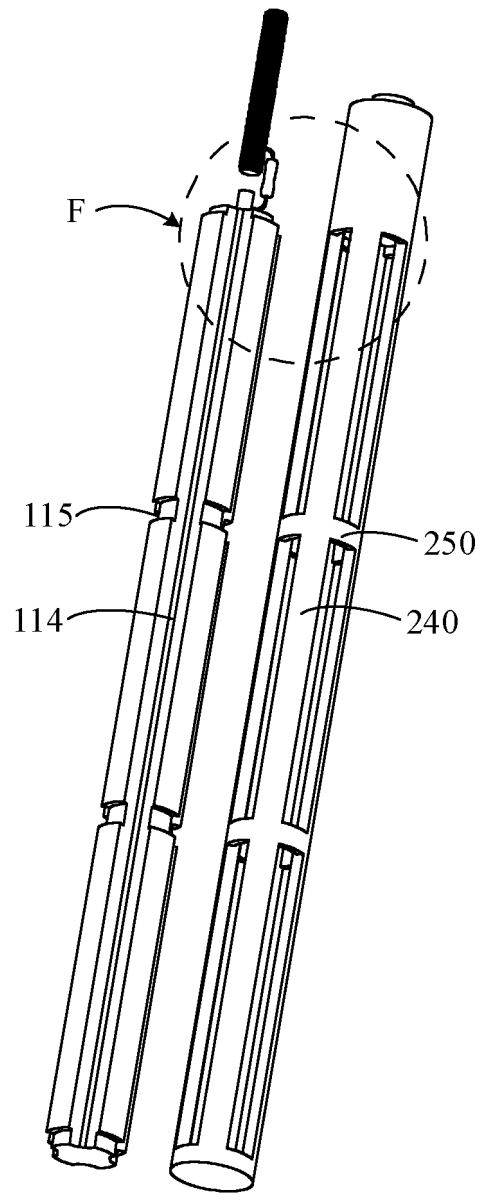


FIG. 19

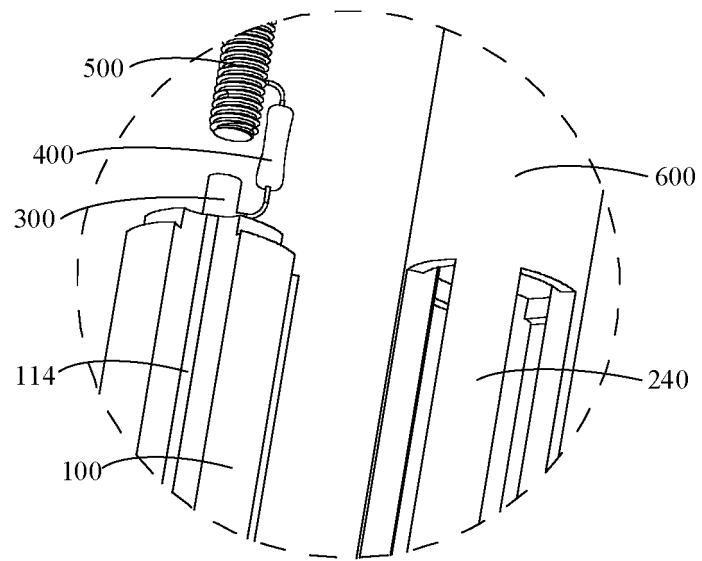


FIG. 20

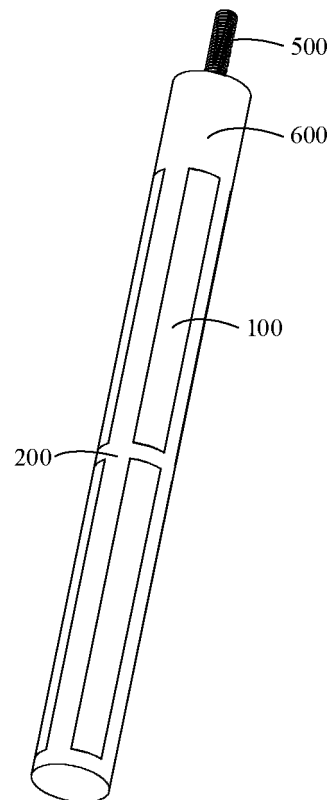


FIG. 21

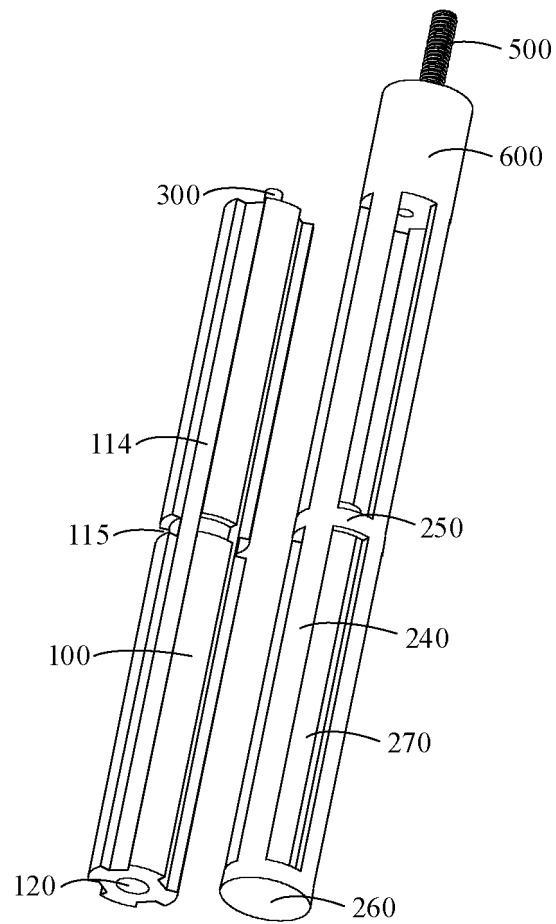


FIG. 22

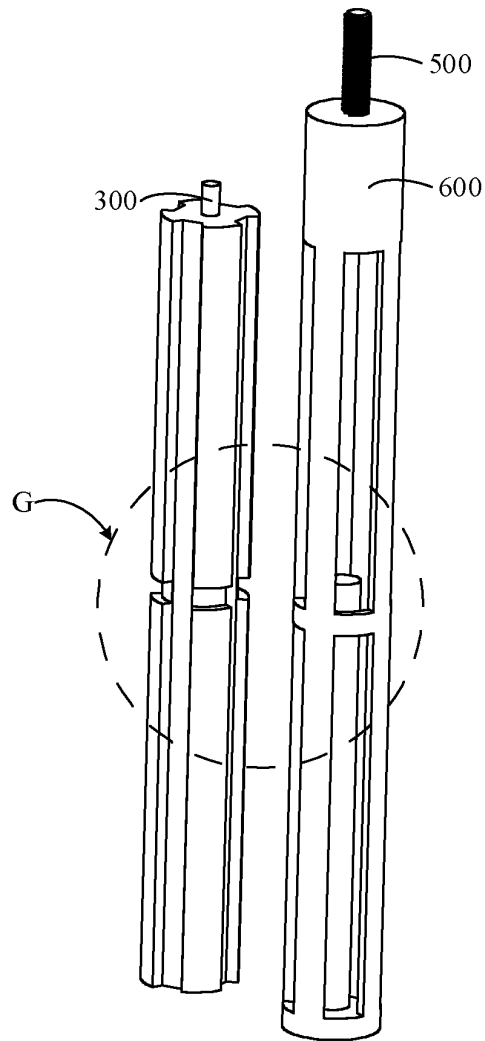


FIG. 23

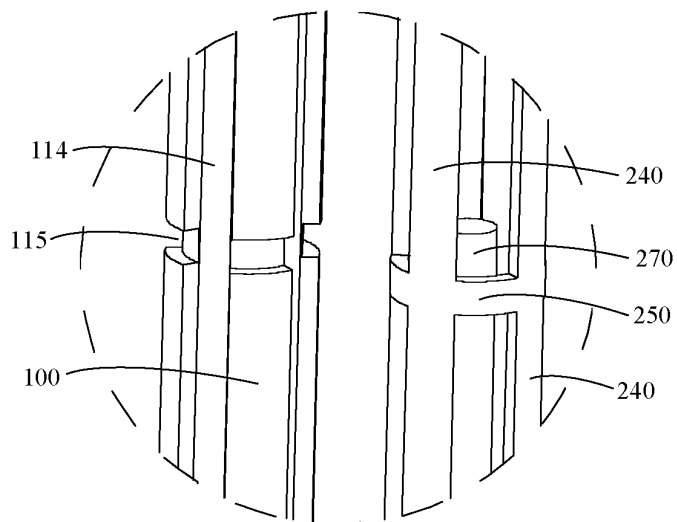


FIG. 24

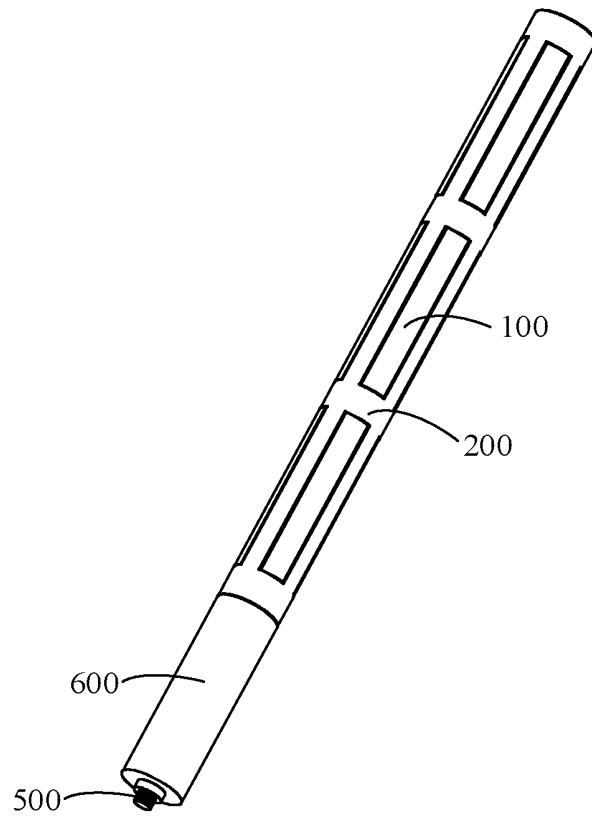


FIG. 25

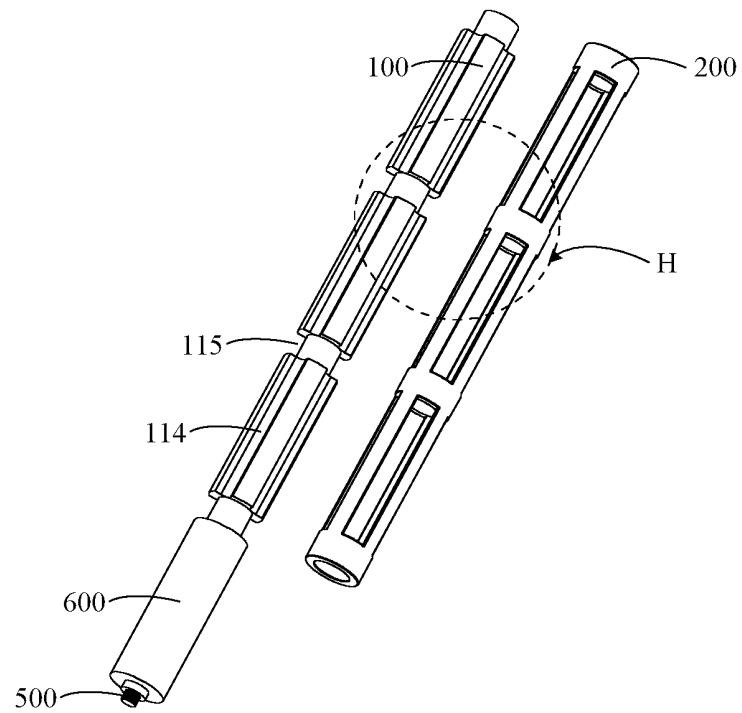


FIG. 26

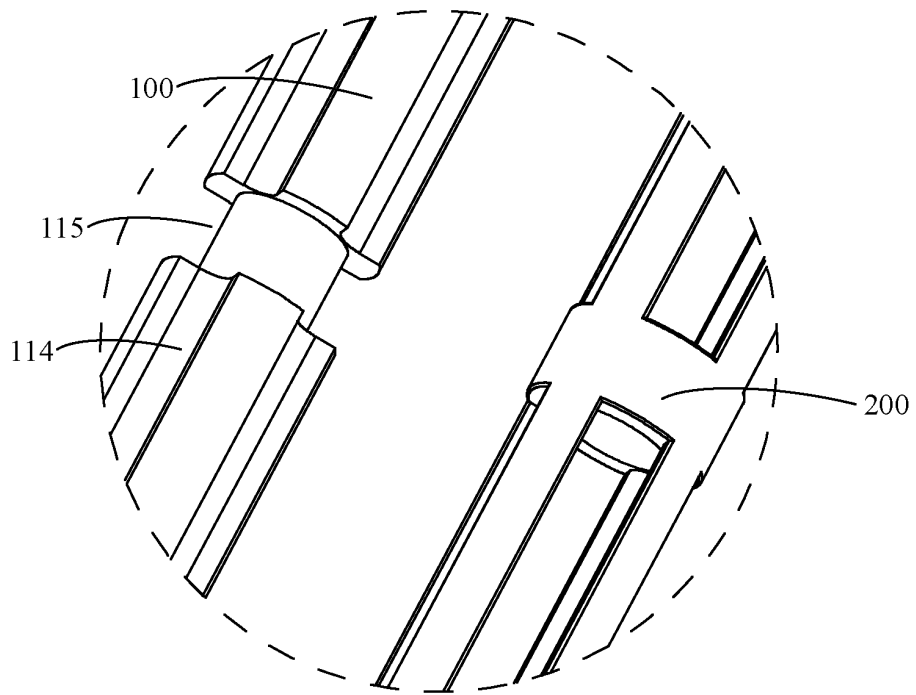


FIG. 27

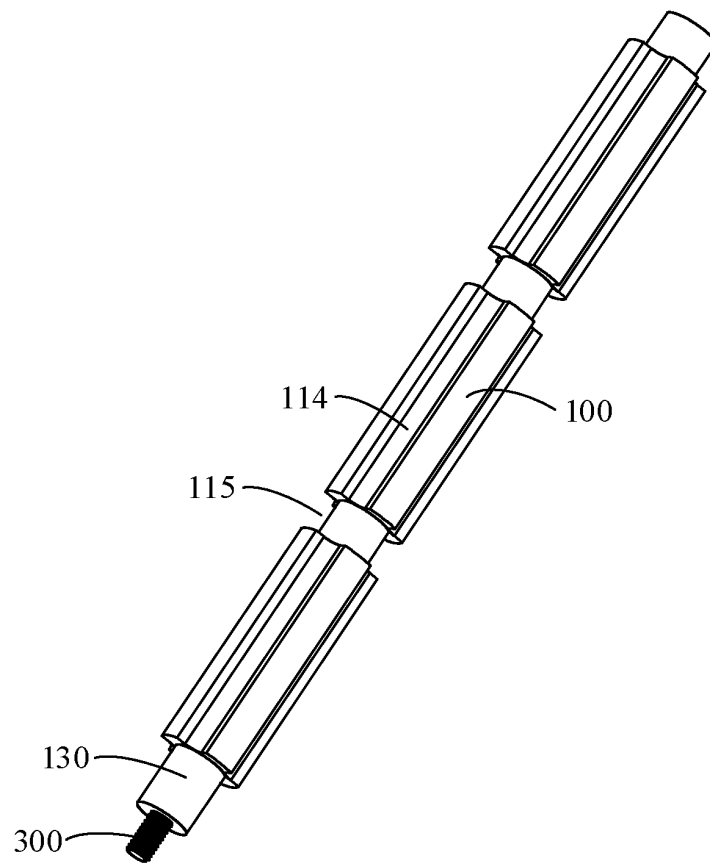


FIG. 28

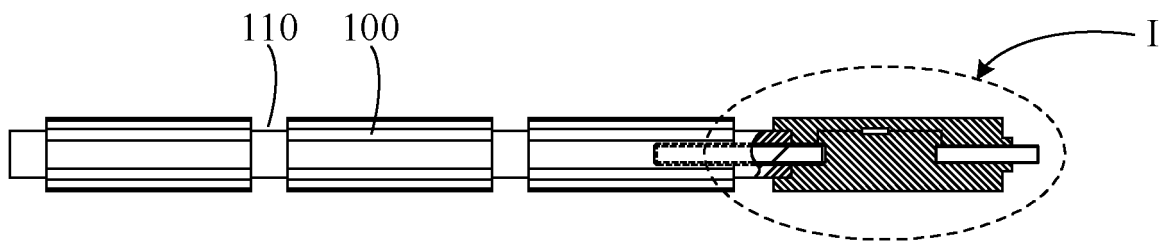


FIG. 29

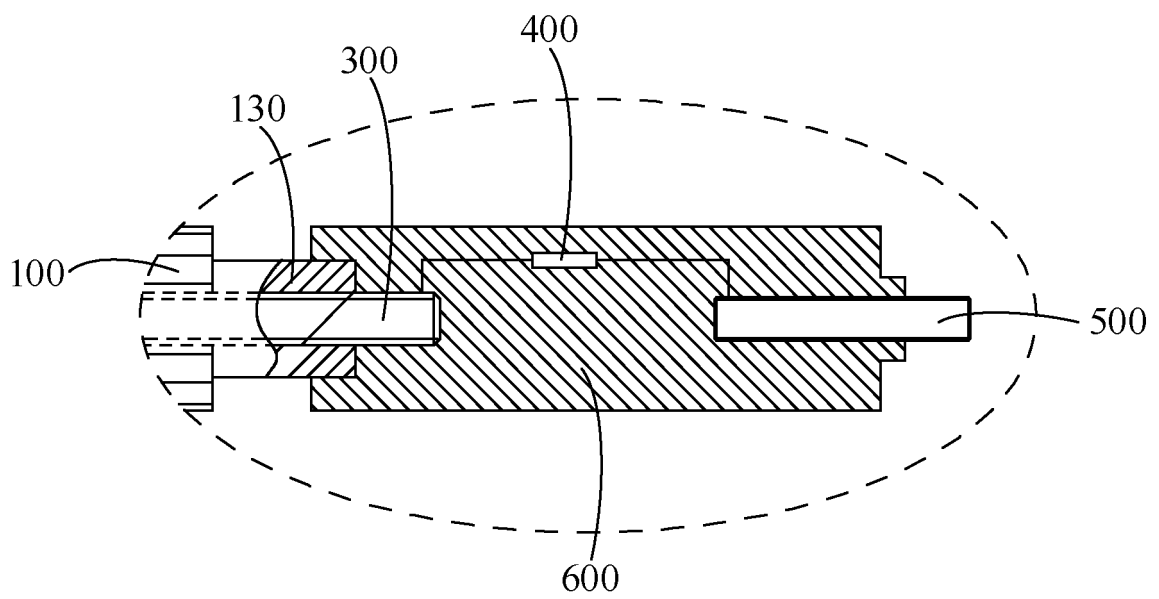


FIG. 30

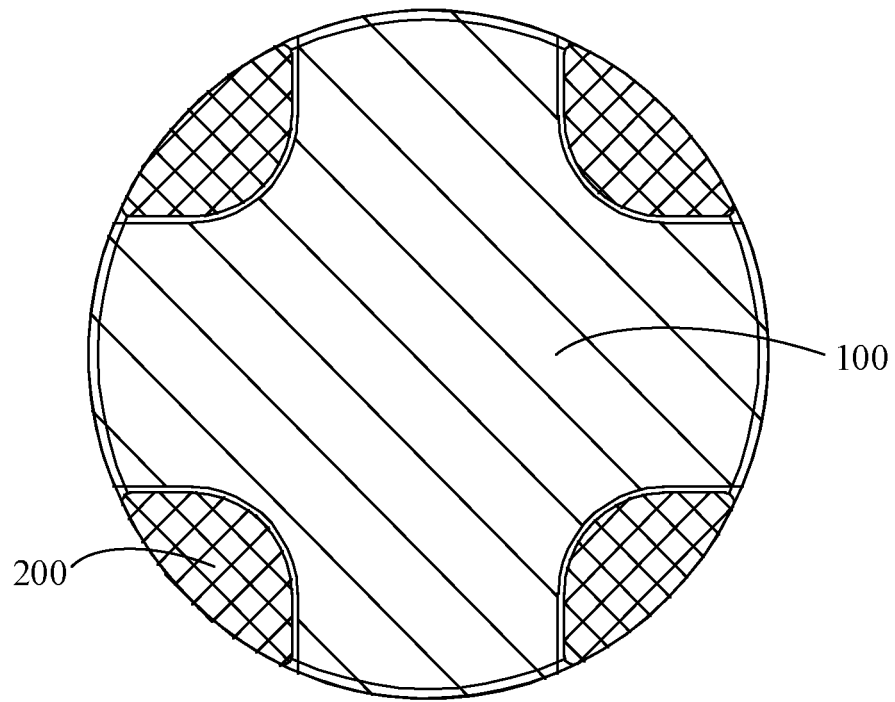


FIG. 31

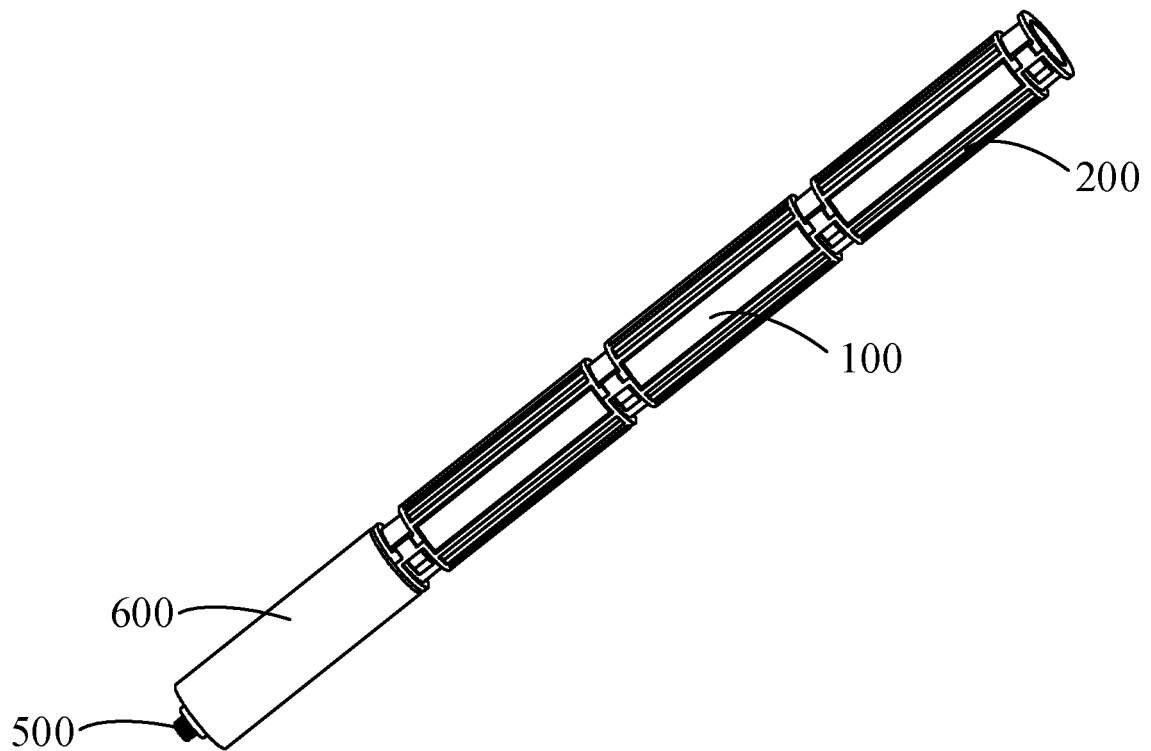


FIG. 32

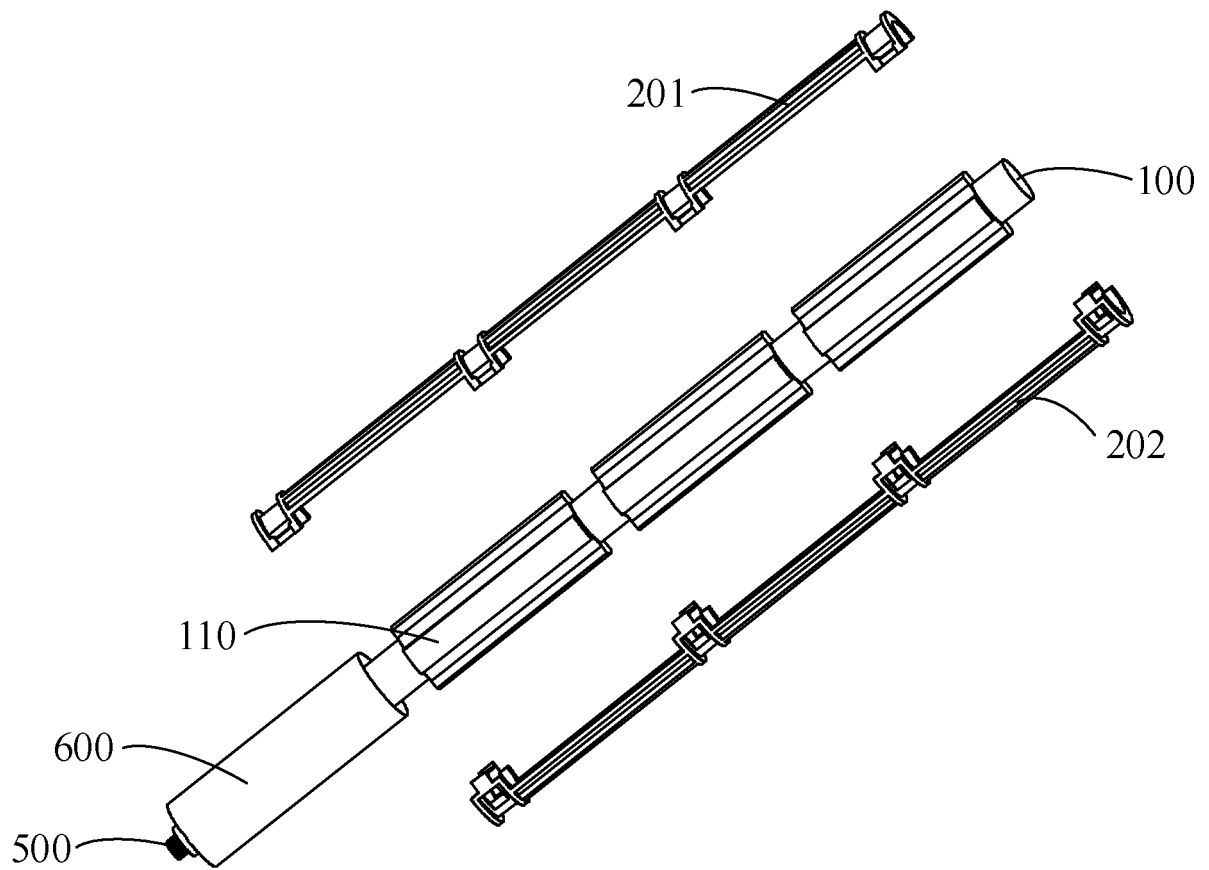


FIG. 33

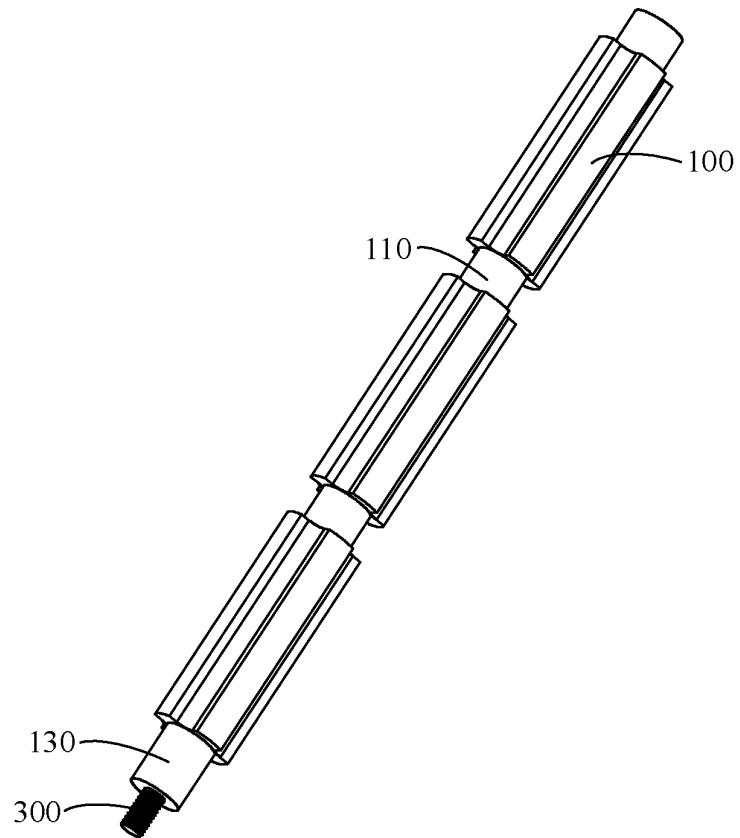


FIG. 34

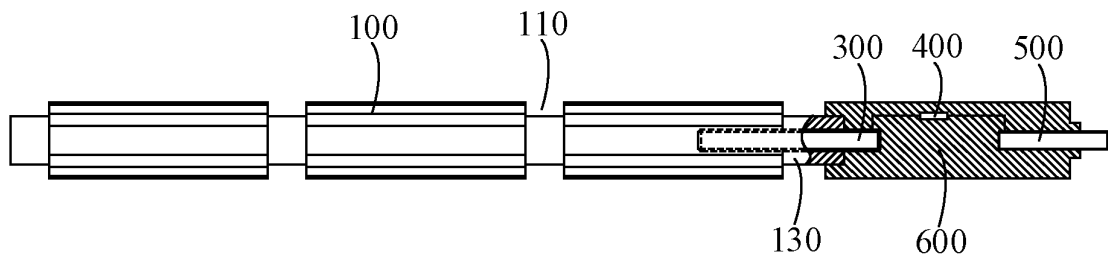


FIG. 35

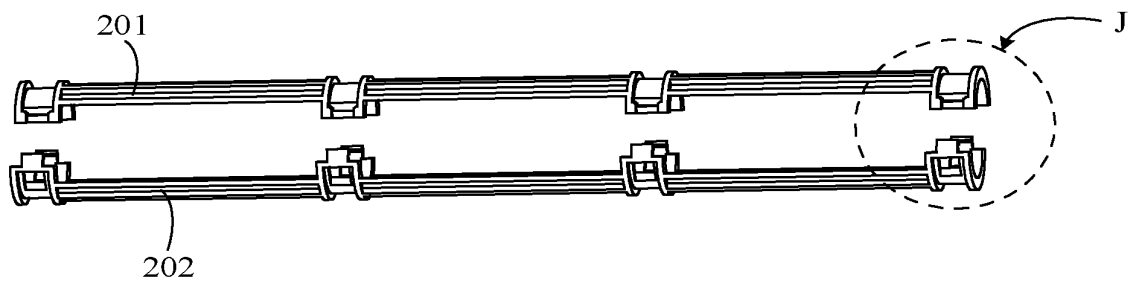


FIG. 36

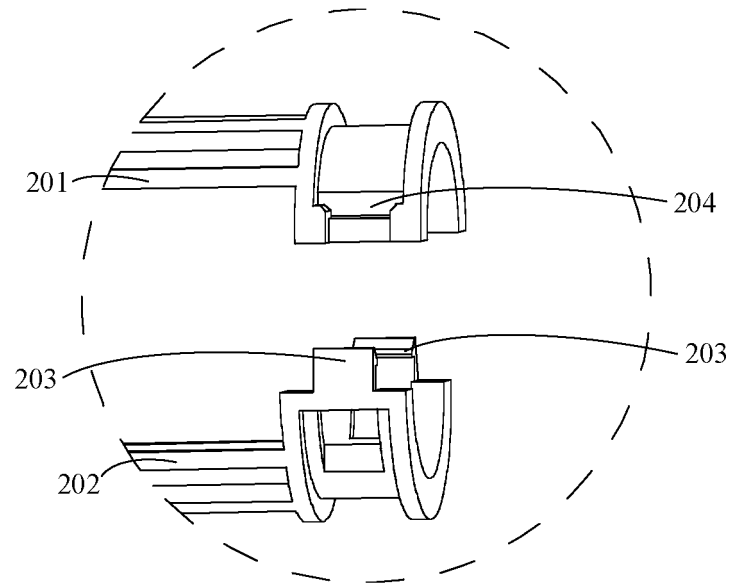


FIG. 37

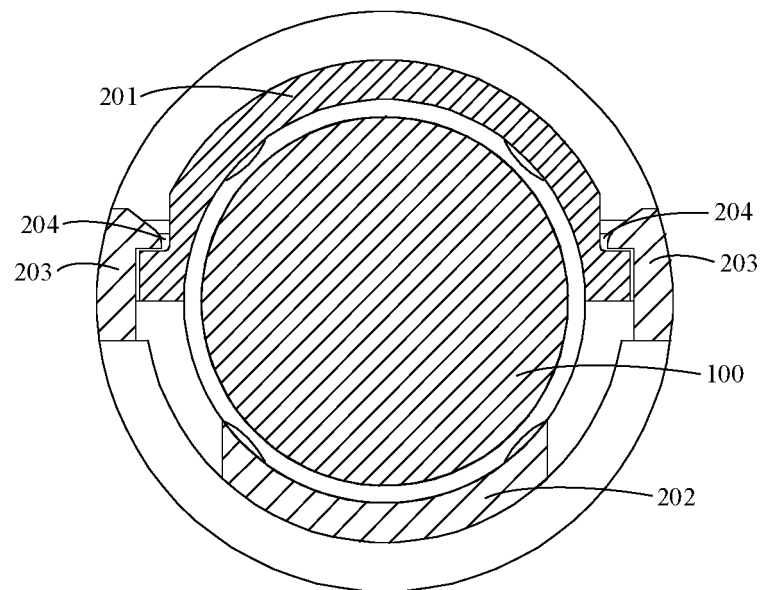


FIG. 38

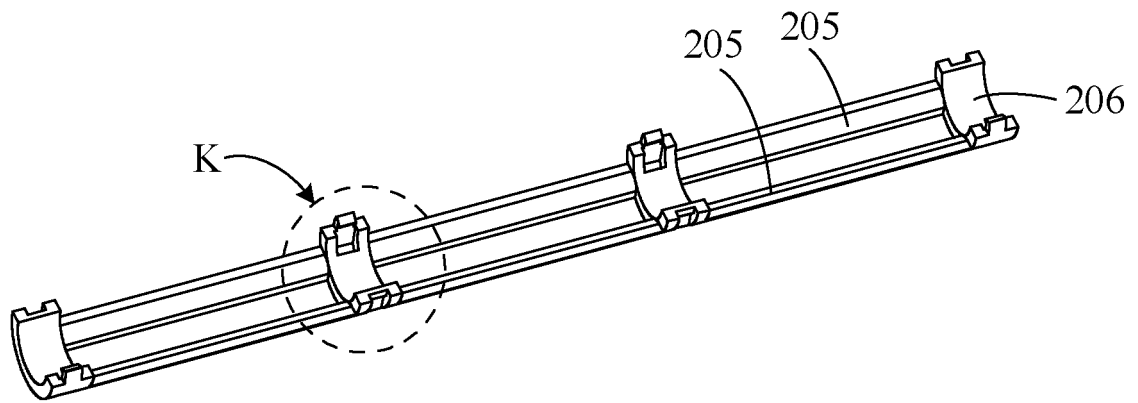


FIG. 39

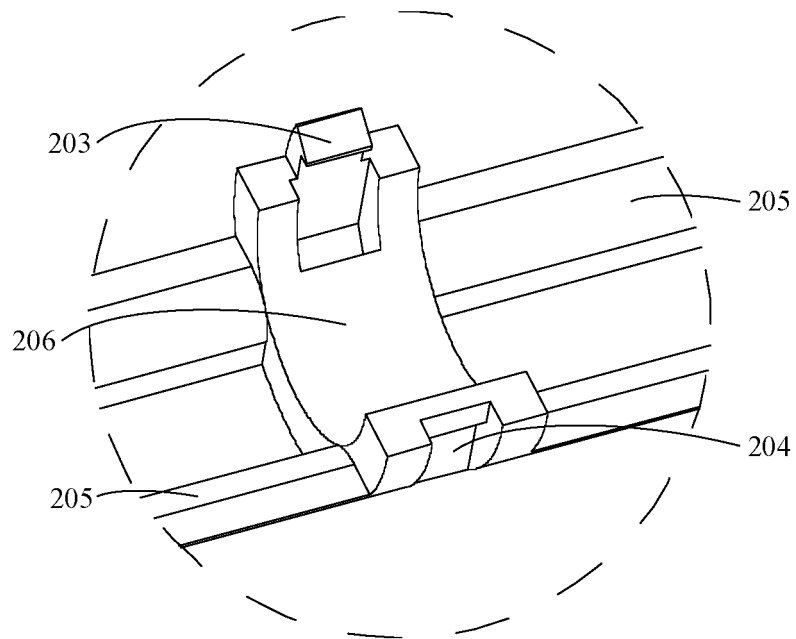


FIG. 40

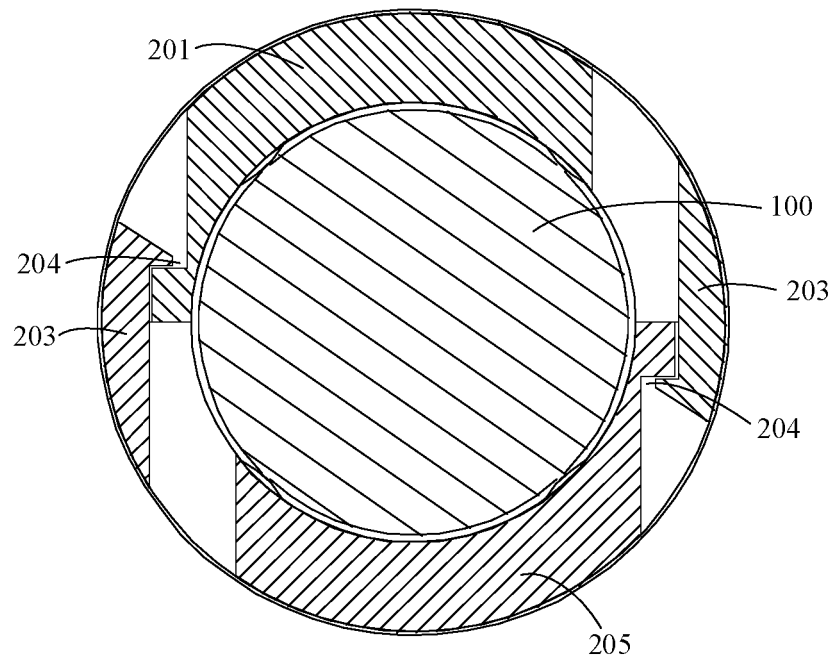


FIG. 41

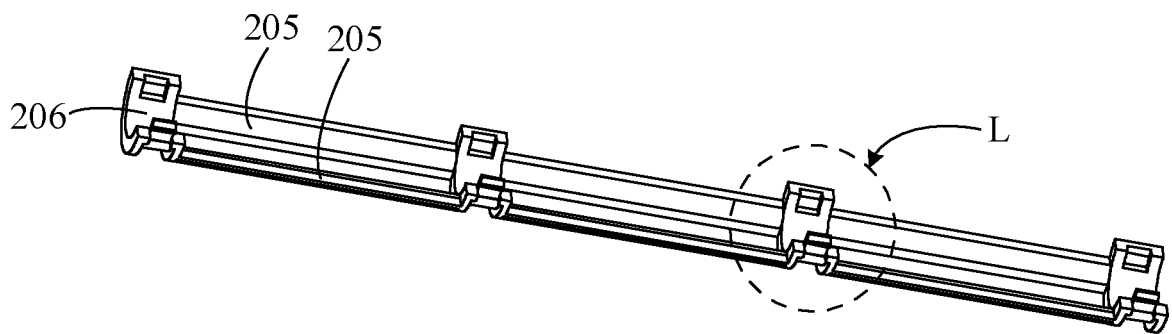


FIG. 42

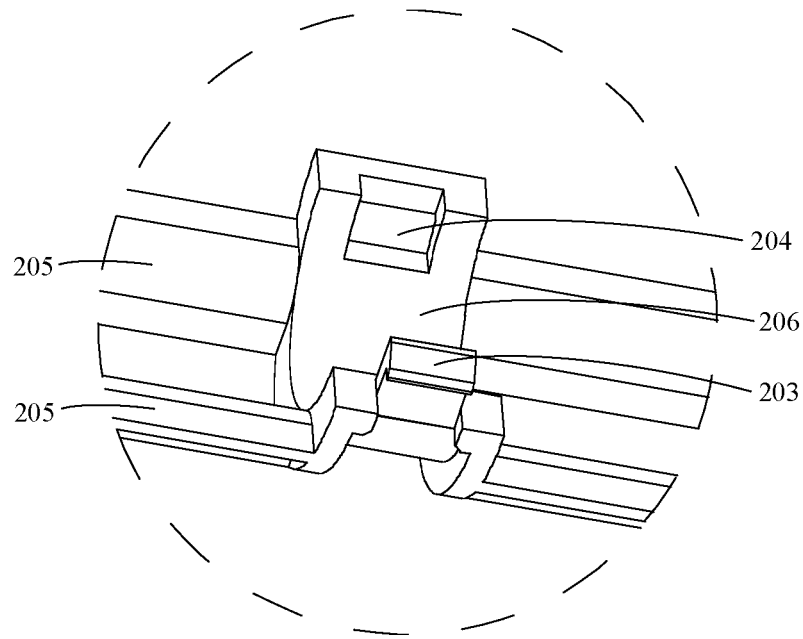


FIG. 43

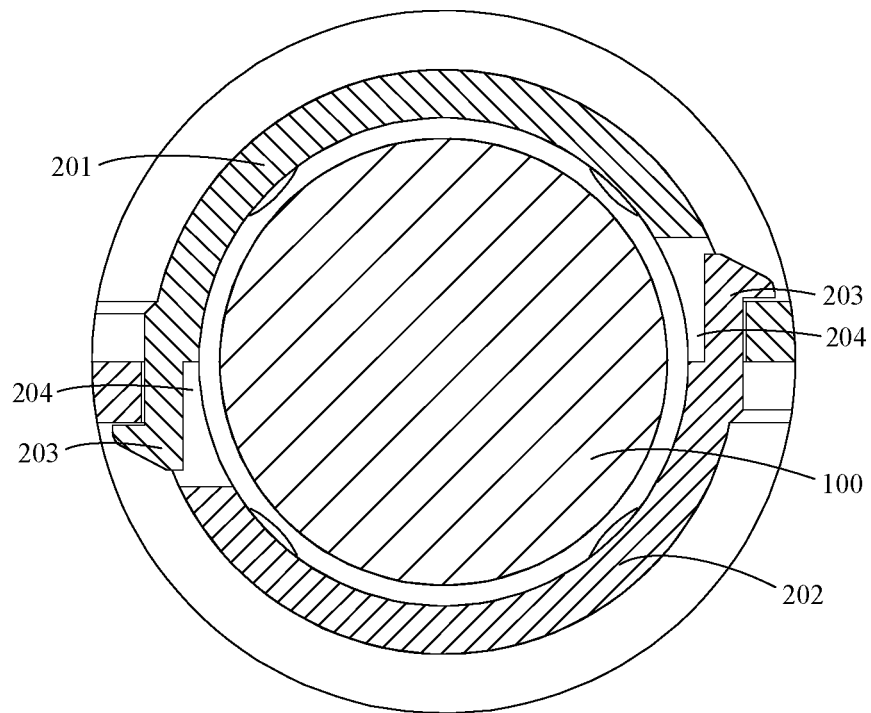


FIG. 44

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2022/142803

A. CLASSIFICATION OF SUBJECT MATTER F24H9/45(2022.01);C23F13/16(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:F24H C23F																				
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; VEN; CNKI; USTXT; EPTXT; WOTXT: 美的, 热水器, 镁棒, 电极, 壳, 套, 罩, 年限, 寿命, 消耗, 腐蚀, 速度, 速率, 电阻, electrode, magnesium, bar, rod, cover, shell, resistance																				
C. DOCUMENTS CONSIDERED TO BE RELEVANT																				
<table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>PX</td> <td>CN 217876493 U (WUHU MIDEA SMART KITCHEN APPLIANCE MANUFACTURING CO., LTD.) 22 November 2022 (2022-11-22) description, paragraphs [0026]-[0157], and figures 1-44</td> <td>1-25</td> </tr> <tr> <td>PX</td> <td>CN 218096636 U (WUHU MIDEA SMART KITCHEN APPLIANCE MANUFACTURING CO., LTD.) 20 December 2022 (2022-12-20) description, paragraphs [0030]-[0160], and figures 1-44</td> <td>1-25</td> </tr> <tr> <td>X</td> <td>CN 109972148 A (WUHAN HAIER WATER HEATER CO., LTD. et al.) 05 July 2019 (2019-07-05) description, paragraphs [0003], [0007], [0008], and [0030]-[0038], and figures 1-6</td> <td>1-25</td> </tr> <tr> <td>X</td> <td>CN 111321415 A (QINGDAO ECONOMIC & TECHNOLOGY DEVELOPMENT ZONE HAIER WATER HEATER CO., LTD.) 23 June 2020 (2020-06-23) description, paragraphs [0034]-[0049], and figures 1-6</td> <td>1-25</td> </tr> <tr> <td>A</td> <td>CN 201652807 U (ZHANG BAOHUA) 24 November 2010 (2010-11-24) entire document</td> <td>1-25</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	PX	CN 217876493 U (WUHU MIDEA SMART KITCHEN APPLIANCE MANUFACTURING CO., LTD.) 22 November 2022 (2022-11-22) description, paragraphs [0026]-[0157], and figures 1-44	1-25	PX	CN 218096636 U (WUHU MIDEA SMART KITCHEN APPLIANCE MANUFACTURING CO., LTD.) 20 December 2022 (2022-12-20) description, paragraphs [0030]-[0160], and figures 1-44	1-25	X	CN 109972148 A (WUHAN HAIER WATER HEATER CO., LTD. et al.) 05 July 2019 (2019-07-05) description, paragraphs [0003], [0007], [0008], and [0030]-[0038], and figures 1-6	1-25	X	CN 111321415 A (QINGDAO ECONOMIC & TECHNOLOGY DEVELOPMENT ZONE HAIER WATER HEATER CO., LTD.) 23 June 2020 (2020-06-23) description, paragraphs [0034]-[0049], and figures 1-6	1-25	A	CN 201652807 U (ZHANG BAOHUA) 24 November 2010 (2010-11-24) entire document	1-25		
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/142803

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2022/142803

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 217876493 U	22 November 2022	None	
CN 218096636 U	20 December 2022	None	
CN 109972148 A	05 July 2019	CN 207958511 U	12 October 2018
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CN 201652807 U	24 November 2010	None	
CN 208980798 U	14 June 2019	None	
CN 210267745 U	07 April 2020	None	

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REFERENCES CITED IN THE DESCRIPTION

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- US 202221655697 [0001]
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