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(71) Applicant: **Intex Industries Xiamen Co. Ltd**
Xiamen, Fujian 361022 (CN)

(72) Inventors:
- **HUANG, Zhi Xiong**
  Xiamen (CN)
- **ZHANG, Ying Biao**
  Xiamen (CN)
- **ZHOU, Zhi Wen**
  Xiamen (CN)

(74) Representative: **Bauer, Dustin**
Reddie & Grose LLP
The White Chapel Building
10 Whitechapel High Street
London E1 8QS (GB)

(54) A HEATER FOR A POOL AND A POOL WITH HEATING FUNCTION

(57) A heater for a pool is provided. The heater comprises a topple sensor (1); a heating assembly (2); a body (3) provided with a water inlet (31) and a water outlet (32); and a controller for driving the heating assembly to heat or stop heating. The heating assembly is arranged in the body for heating water flowing through the body. The topple sensor comprises a moving member (11), a fixing member (12) and a sensor (13), the fixing member being provided with a chamber for accommodating the moving member, and the chamber being provided with a taper, the sensor being used for sensing whether the relative position of the moving member and the fixing member changes. When the fixing member topples over, the sensor outputs a toppling signal to the controller, so that the controller drives the heating assembly to stop heating. A pool with heating function is also provided.

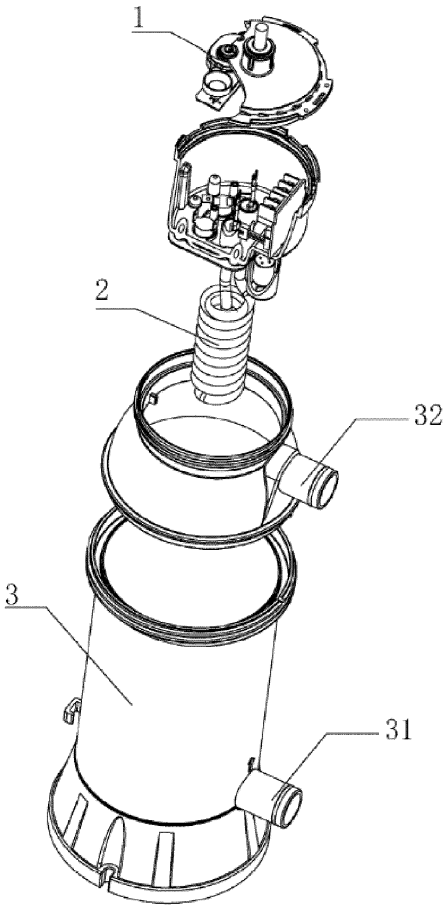

Figure 1

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Description

Field of the invention

[0001] The present invention relates to an outdoor article, in particular to a pool.

Background of the invention

[0002] At present, with the continuous development of social economy, the people's demand for cultural and physical exercise is getting higher and higher. Swimming, as an all-round fitness method, is increasingly favored by the public. Especially in hot summer, swimming is the first choice for outdoor sports. However, public swimming pools have problems such as overcrowding and poor water quality, so more and more people choose to place air inflation pools in their own yards, and then use filtering devices and heaters to purify water quality and increase the water temperature, so that they can be used all year round. However, the existing heaters only have simple heating functions, especially when the heater cannot be turned off immediately after topple.

Summary of the invention

[0003] To solve the main technical problem, the present invention provides a heater for a pool, which can automatically stop heating when topple.

[0004] To solve the main technical problem, the present invention provides a heater for a pool, which comprises a topple sensor, a heating assembly, a body and a controller for driving the heating assembly to heat or stop heating, the body being provided with a water inlet and a water outlet, and the heating assembly being arranged in the body for heating water flowing through the body.

[0005] The topple sensor comprises a moving member, a fixing member and a sensor; the fixing member is provided with a chamber for accommodating the moving member, and the chamber is provided with a taper; the sensor is used for sensing whether the relative position of the moving member and the fixing member changes; when the fixing member topples over, the moving member moves relative to the fixing member, and the sensor outputs a toppling signal to the controller, so that the controller drives the heating assembly to stop heating.

[0006] In another preferred embodiment, the moving member is a magnet assembly, and the sensor is a magnetic sensor and is arranged at the bottom of the chamber corresponding to the fixing member; when the fixing member does not topple over, the moving member contacts the bottom of the chamber of the fixing member, and the magnetic sensor receives a first magnetic field strength signal; when the fixing member topples over, the moving member is separated from the bottom of the chamber of the fixing member, and the magnetic sensor receives a second magnetic field strength signal; the strength of the first magnetic field strength signal is greater than the second magnetic field strength signal.

[0007] In another preferred embodiment, the magnet assembly is a magnet fixing base and a magnet; the magnet is arranged at the bottom of the magnet fixing base.

[0008] In another preferred embodiment, the magnet fixing base is in the shape of a cone.

[0009] In another preferred embodiment, it further comprises an anti dry heating assembly connected to the controller; when the water level in the body is lower than a set threshold value, the anti dry heating assembly outputs a anti dry heating signal to the controller, so that the controller drives the heating assembly to stop heating.

[0010] In another preferred embodiment, the anti dry heating assembly is a float switch; when the water level is lower than a set threshold value, the float switch is turned off.

[0011] In another preferred embodiment, it further comprises a temperature sensor, which is connected with the controller; the temperature sensor is used to detect the temperature in the body; when the temperature exceeds a set threshold value, the temperature sensor outputs a temperature limiting signal to the controller, so that the controller drives the heating assembly to stop heating.

[0012] In another preferred embodiment, the temperature sensor is arranged above the heating assembly along the height direction of the body.

[0013] In another preferred embodiment, the heating assembly and the temperature sensor are fixed on the same metal support.

[0014] In another preferred embodiment, the water inlet is arranged at the lower end of the body along the height direction, and the water outlet is arranged at the upper end of the body along the height direction.

[0015] In another preferred embodiment, the outer side of the heating assembly is provided with an anti-corrosion metal block.

[0016] In another preferred embodiment, the chemical property of the anti-corrosion metal block is more active than that of the heating assembly.

[0017] The present invention further provides a pool with heating function, which comprises a pool body, a water pump and a heater; the water pump is connected between the water outlet of the pool body and the water inlet of the heater, and the water outlet of the heater is connected to the water inlet of the pool body.

[0018] Compared with the prior art, the technical solution of the present disclosure may have the following beneficial effects:

1. The present invention provides a heater for a pool, which outputs the topple signal through the change of the position of the topple sensor in the two states of topple and not topple of the body, thereby controlling the heating to stop heating after the body topple.
2. The present invention provides a heater for a pool, which detects whether the water level in the body is

normal through the characteristics of a float switch that is turned on when there is water and turned off when there is water shortage. If the water level in the body is too low, the float switch is disconnected, and the heating assembly stops heating to avoid dry heating.

3. The present invention provides a heater for a pool, which detects the temperature of the body through a temperature sensor, so as to open the heating assembly when the water temperature is low, and turn off the heating assembly when the water temperature is high, so that the water temperature is in a relatively constant range.

Brief description of the drawings

[0019]

FIG. 1 illustrates an exploded view of the heater in a preferred embodiment of the present invention;

FIG. 2 illustrates a stereoscopic view of the topple sensor in the preferred embodiment of the present invention;

FIG. 3 illustrates a sectional view of the topple sensor in the preferred embodiment of the present invention;

FIG. 4 illustrates a sectional view of the heater in the preferred embodiment of the present invention;

FIG. 5 illustrates a sectional view of another position of the heater in the preferred embodiment of the present invention;

FIG. 6 illustrates a schematic view of the anti-corrosion metal block in the preferred embodiment of the present invention;

FIG. 7 illustrates a schematic view of the support in the preferred embodiment of the present invention;

FIG. 8 illustrates a schematic view of fixing the power wire of the heater in the preferred embodiment of the present invention;

FIG. 9 illustrates the use view of the heater in the preferred embodiment of the present invention.

Detailed description of the embodiments

[0020] The following will clearly and completely describe the technical solution in the embodiment of the present invention in combination with the drawings in the embodiment of the present invention; obviously, the described embodiments are only part of the embodiments of the present invention, not all of them. Based on the embodiments of the present invention, all other embodiments obtained by a person skilled in the field without making creative work belong to the scope of protection of the present invention.

[0021] In the description of the present invention, it should be noted that the orientation or position relationship indicated by the terms "up", "down", "inside", "outside", "top/bottom", etc. is based on the orientation or position relationship shown in the drawings, which is only for the convenience of describing the present invention and simplifying the description, rather than indicating or implying that the device or element referred to must have a specific orientation, be constructed and operated in a specific orientation. Therefore, it cannot be understood as a limitation of the present invention. In addition, the terms "first" and "second" are only used to describe the purpose and cannot be understood as indicating or implying relative importance. In the description of the present invention, it should be noted that, unless otherwise specified and defined, the terms "installation", "set", "sleeve/connection", "connection", etc. should be understood in a broad sense. For example, "connection" can be wall mounted connection, removable connection, or integrated connection, which can be mechanical connection, electrical connection, direct connection, or indirect connection through intermediate media, it can be the connection between two assemblies. For those skilled in the art, they can understand the specific meaning of the above terms in the present invention.

[0022] Referring to FIGS. 1 to 9, this embodiment provides a heater for a pool, which comprises a topple sensor 1, a heating assembly 2, a body 3 and a controller for driving the heating assembly 2 to heat or stop heating. The body 3 is provided with a water inlet 31 and a water outlet 32, and the heating assembly 2 is arranged in the body 3 for convection heating of water flowing through the body 3;

[0023] The topple sensor 1 comprises a moving member 11, a fixing member 12 and a sensor 13. The fixing member 12 has a chamber for accommodating the moving member 11, and the chamber has a taper; the sensor 13 is used to sense whether the relative position of the moving member 11 and the fixing member 12 have changed; when the fixing member 12 topples over, the moving member 11 moves relative to the fixing member 12, and the sensor 13 outputs a topple signal to the controller, so that the controller drives the heating assembly 2 to stop heating.

[0024] The heater for the pool outputs the topple signal through the change of the position of the topple sensor 1 when the body 3 topples over or not, and then controls the heater to stop heating after the body 3 is topple.

[0025] In order to achieve the above anti toppling effect, the moving member 11 is a magnet assembly, and the sensor 13 is a magnetic sensor and is arranged at the bottom of the chamber corresponding to the fixing member 12; when the fixing member 12 does not topple over, the moving member 11 contacts the bottom of the chamber of the fixing member 12, and the magnetic sensor receives a first magnetic field strength signal; when the fixing member 12 topples over, the moving member 11 is separated from the bottom of the chamber of the fixing member 12, and the magnetic sensor receives a second magnetic field strength signal; the strength of the first magnetic field strength signal is greater than the second magnetic field strength signal.

[0026] More specifically, the magnet assembly com-

prises a magnet fixing base 111 and a magnet 112; the magnet 112 is arranged at the bottom of the magnet fixing base 111. The magnet fixing base 111 is in the shape of a cone.

[0027] This embodiment further comprises an anti dry heating assembly 4, which is connected to the controller; when the water level in the body 3 is lower than a set threshold value, the anti dry heating assembly 4 outputs an anti dry heating signal to the controller, so that the controller drives the heating assembly 2 to stop heating.

[0028] Specifically, the anti dry heating assembly 4 is a float switch; when the water level is lower than a set threshold value, the float switch is disconnected.

[0029] In addition, during the use of the heater, it is better to keep the water temperature stable within a set threshold value, so that users will not have a bad experience because of the sudden cold and hot. Therefore, it further comprises a temperature sensor 5, which is connected to the controller; the temperature sensor 5 is used to detect the temperature in the body 3. When the temperature exceeds a set threshold value, the temperature sensor 5 outputs a temperature limiting signal to the controller so that the controller drives the heating assembly 2 to stop heating. Similarly, when the temperature is lower than a set threshold value, the temperature sensor 5 outputs a temperature limiting signal to the controller so that the controller drives the heating assembly 2 to start heating. In this way, the water temperature can be maintained within a range. In this embodiment, the heating assembly 2 and the temperature sensor 5 are fixed on the same metal support 21, so that the temperature sensor 5 can sense the water temperature more quickly and accurately during normal operation, and can collect more heat in the air in a larger area during dry heating, so as to achieve quick tripping response.

[0030] When the heating assembly 2 works, the hot air moves upward. Therefore, the temperature sensor 5 is set above the heating assembly 2 along the height direction of the body 3 to detect the temperature change more accurately and timely.

[0031] In addition, the outer side of the heating assembly 2 is provided with an anti-corrosion metal block 20.

[0032] The anti-corrosion metal block 20 is conductive to the heated liquid, and the chemical property of the anti-corrosion metal block 20 is more active than that of the heating assembly 2. The heating assembly 2 can be protected from corrosion by sacrificing the anti-corrosion metal block 20, and the anti-corrosion metal block 20 can be replaced regularly. The anti-corrosion metal block 20 can be made of zinc alloy, magnesium alloy, aluminum alloy, etc.

[0033] The water inlet 31 is arranged at the lower end of the body 3 along the height direction, and the water outlet 32 is arranged at the upper end of the body 3 along the height direction. This is good for exhaust.

[0034] Moreover, in this embodiment, in order to avoid the problem of water leakage inside the heater caused by the pulling of the power wire 6 of the heater, the power line 6 is first clamped by the wire clip. The wire clip is made of hard material, which plays a fixing role and does not participate in the sealing. Therefore, the sealing structure will not be affected during the pulling of the power line 6, and the leakage will not be caused by insufficient interference due to excessive deformation of the wire clip.

[0035] The sealing structure is realized through a sealing ring 7 and a fixing cover plate 8, so the number of parts involved in the sealing is relatively small, the cumulative tolerance is lower, and the production tolerance is improved.

[0036] Referring to FIG. 9, this embodiment further provides a pool with heating function, which comprises a pool body 9, a water pump 10 and the heater as described above; the water pump 10 is connected between the water outlet of the pool body 9 and the water inlet of the heater, and the water outlet of the heater is connected to the water inlet of the pool body 9.

[0037] It will be apparent to those skilled in the art that various modifications and variation can be made in the present disclosure without departing from the spirit or scope of the disclosure. Thus, it is intended that the present disclosure cover the modifications and variations of this disclosure provided they come within the scope of the appended claims and their equivalents.

Claims

1. A heater for a pool, comprising:
   a topple sensor; a heating assembly; a body; and a controller for driving the heating assembly to heat or stop heating,

   wherein the body is provided with a water inlet and a water outlet,
   wherein the heating assembly is arranged in the body for heating water flowing through the body,
   wherein the topple sensor comprises a moving member, a fixing member and a sensor, the fixing member being provided with a chamber for accommodating the moving member, and the chamber being provided with a taper, the sensor being used for sensing whether the relative position of the moving member and the fixing member changes, wherein when the fixing member topples over, the moving member moves relative to the fixing member, and the sensor outputs a toppling signal to the controller, so that the controller drives the heating assembly to stop heating.

2. The heater for a pool according to claim 1, wherein the moving member is a magnet assembly, and the sensor is a magnetic sensor and is arranged at the bottom of the chamber corresponding to the fixing member, wherein when the fixing member does not topple over, the moving member contacts the bottom

of the chamber of the fixing member, and the magnetic sensor receives a first magnetic field strength signal, and wherein when the fixing member topples over, the moving member is separated from the bottom of the chamber of the fixing member, and the magnetic sensor receives a second magnetic field strength signal, the strength of the first magnetic field strength signal being greater than the second magnetic field strength signal.

3. The heater for a pool according to claim 2, wherein the magnet assembly is a magnet fixing base and a magnet, the magnet being arranged at the bottom of the magnet fixing base.

4. The heater for a pool according to claim 3, wherein the magnet fixing base is in the shape of a cone.

5. The heater for a pool according to any of claims 1-4, further comprising an anti dry heating assembly connected to the controller, wherein when the water level in the body is lower than a set threshold value, the anti dry heating assembly outputs an anti dry heating signal to the controller, so that the controller drives the heating assembly to stop heating.

6. The heater for a pool according to claim 5, wherein the anti dry heating assembly is a float switch, wherein when the water level is lower than a set threshold value, the float switch is turned off.

7. The heater for a pool according to any preceding claim, further comprising a temperature sensor, which is connected with the controller, the temperature sensor being used to detect a temperature in the body, wherein when the temperature exceeds a set threshold value, the temperature sensor outputs a temperature limiting signal to the controller, so that the controller drives the heating assembly to stop heating.

8. The heater for a pool according to claim 7, wherein the temperature sensor is arranged above the heating assembly along the height direction of the body.

9. The heater for a pool according to claim 8, wherein the heating assembly and the temperature sensor are fixed on the same metal support.

10. The heater for a pool according to any preceding claim, wherein the water inlet is arranged at the lower end of the body along the height direction, and the water outlet is arranged at the upper end of the body along the height direction.

11. The heater for a pool according to any preceding claim, wherein the outer side of the heating assembly is provided with an anti-corrosion metal block, the anti-corrosion metal block being conductive to the heated liquid, and the chemical property of the anti-corrosion metal block is more active than that of the heating assembly.

12. A pool with heating function, comprising a pool body, a water pump and a heater according to any of claims 1-11, the water pump being connected between a water outlet of the pool body and the water inlet of the heater, and the water outlet of the heater being connected to a water inlet of the pool body.

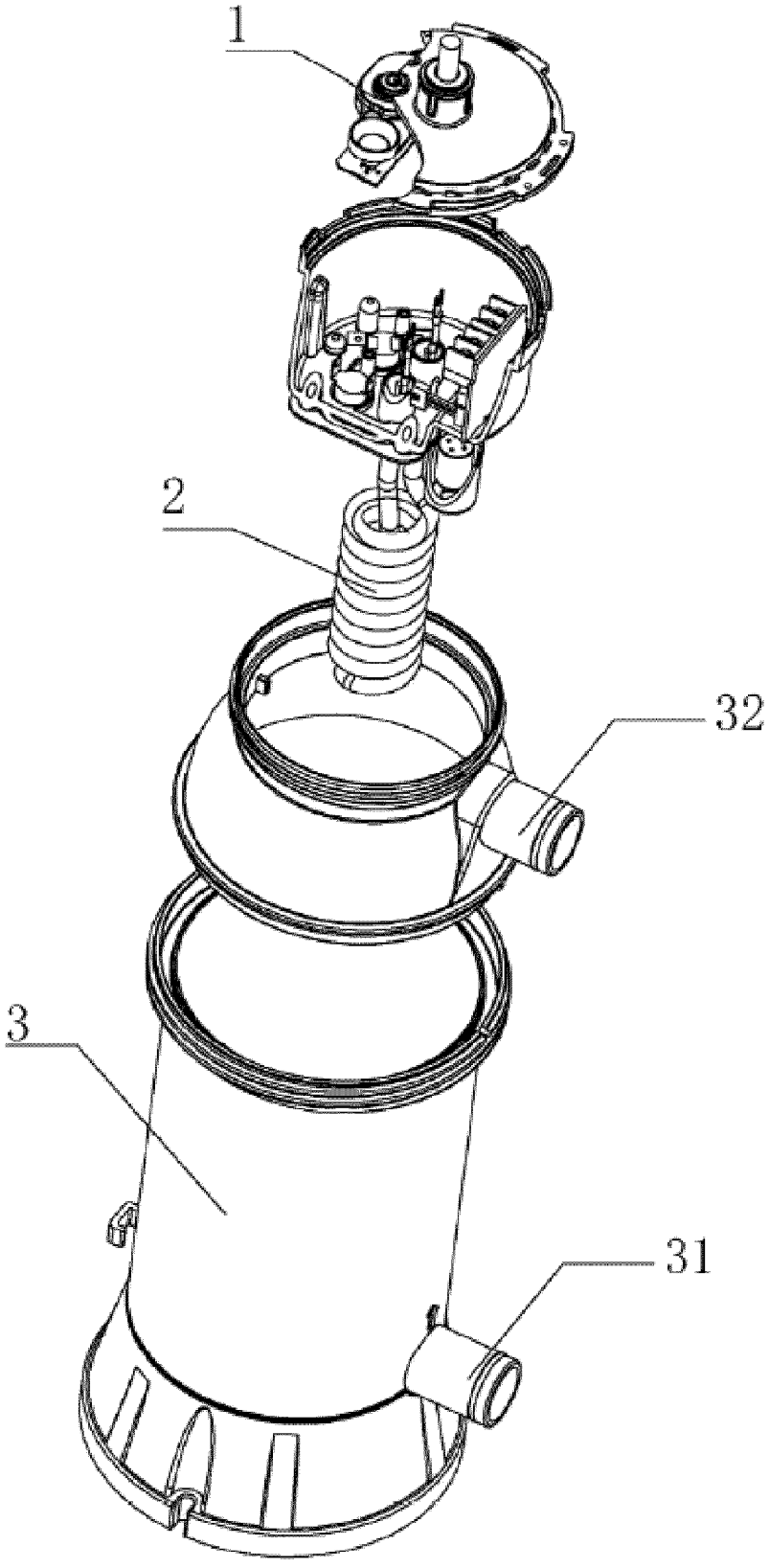

Figure 1

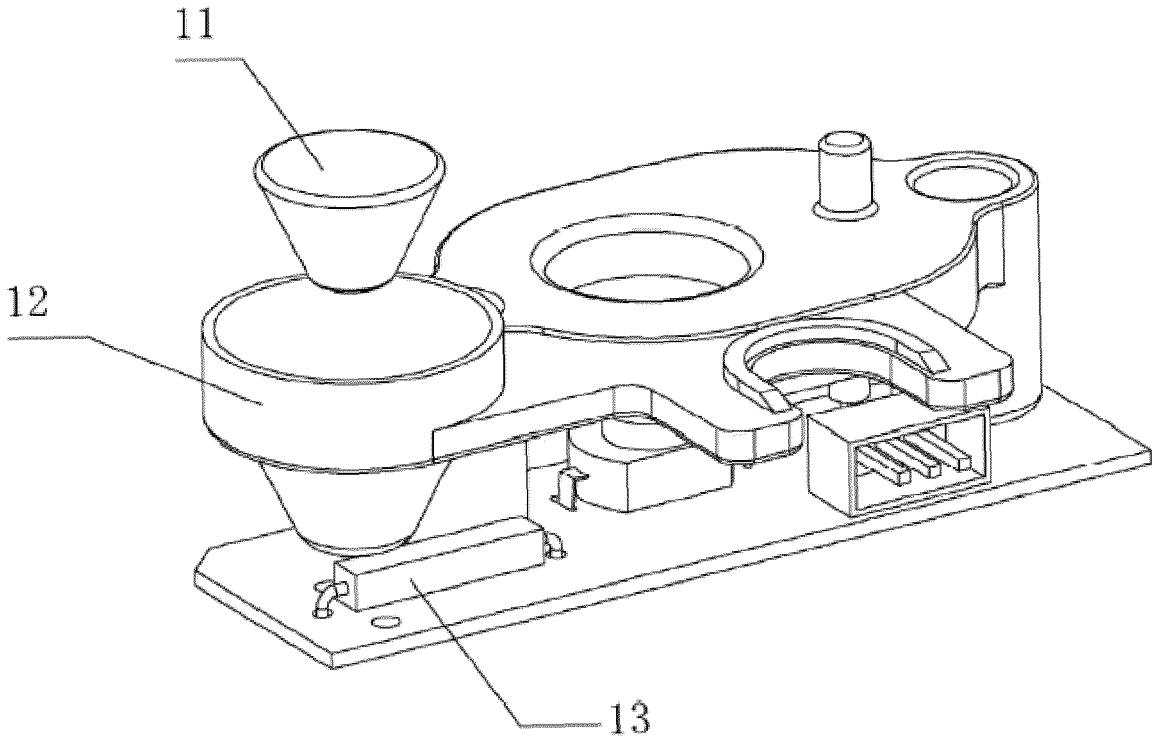

Figure 2

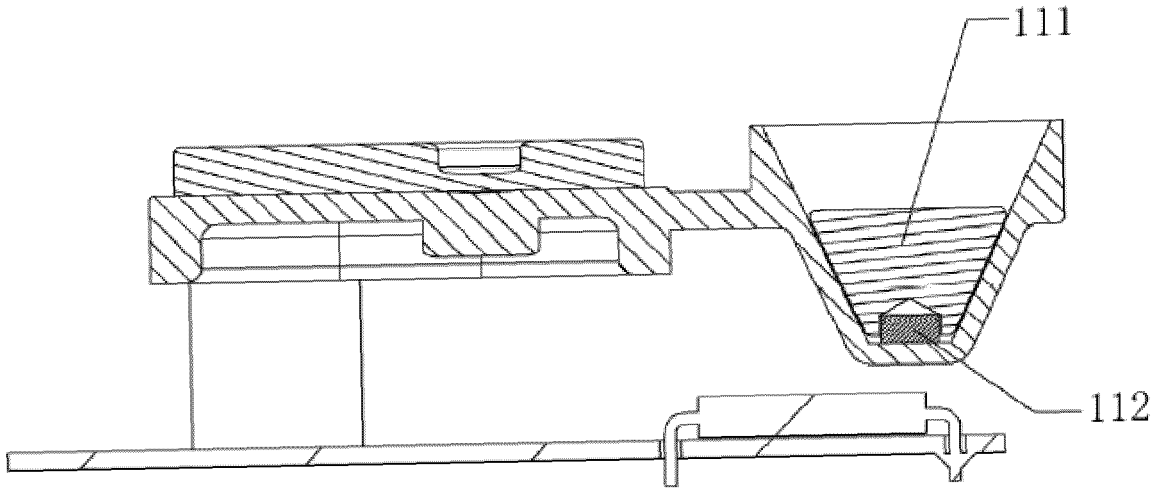

Figure 3

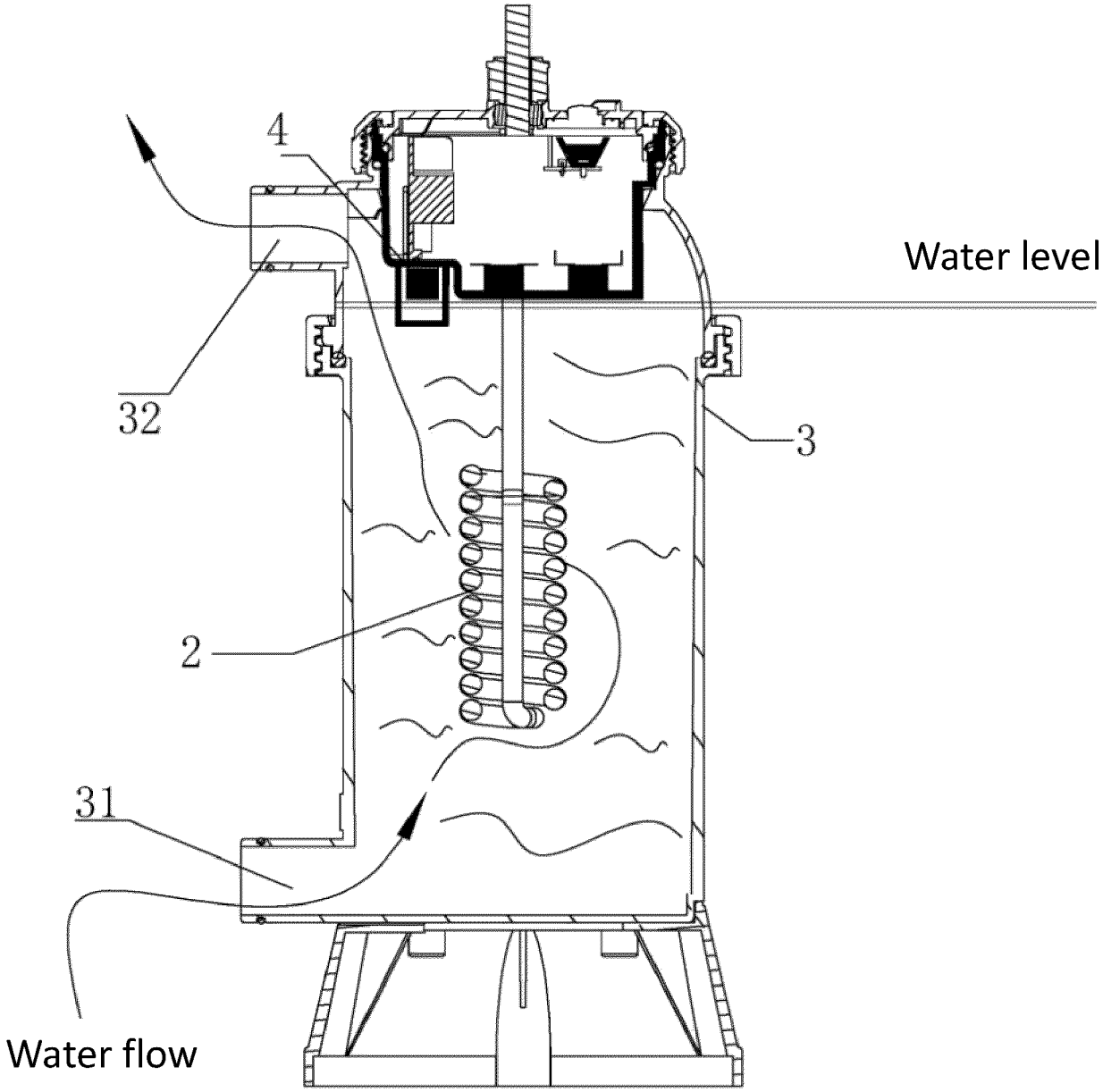

Figure 4

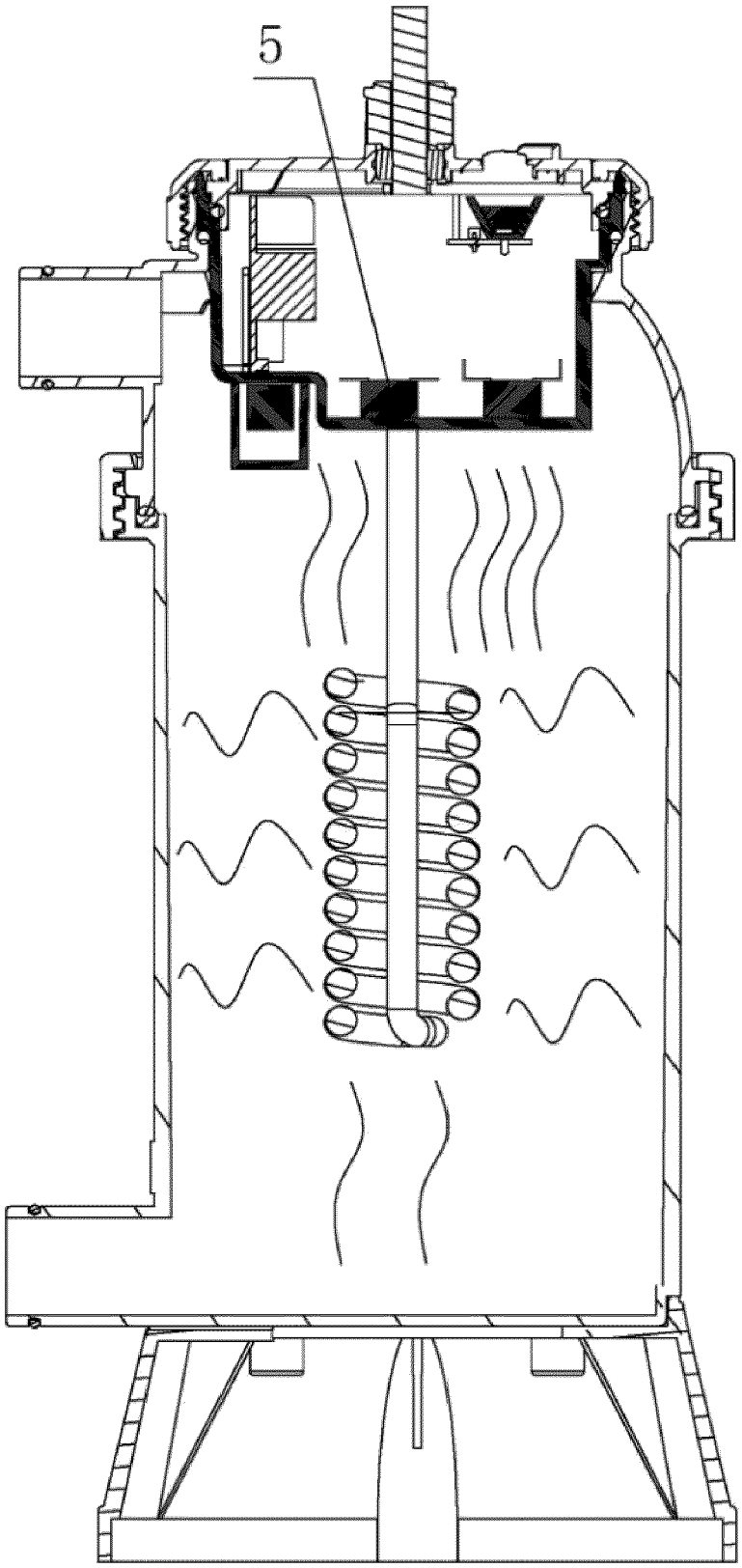

Figure 5

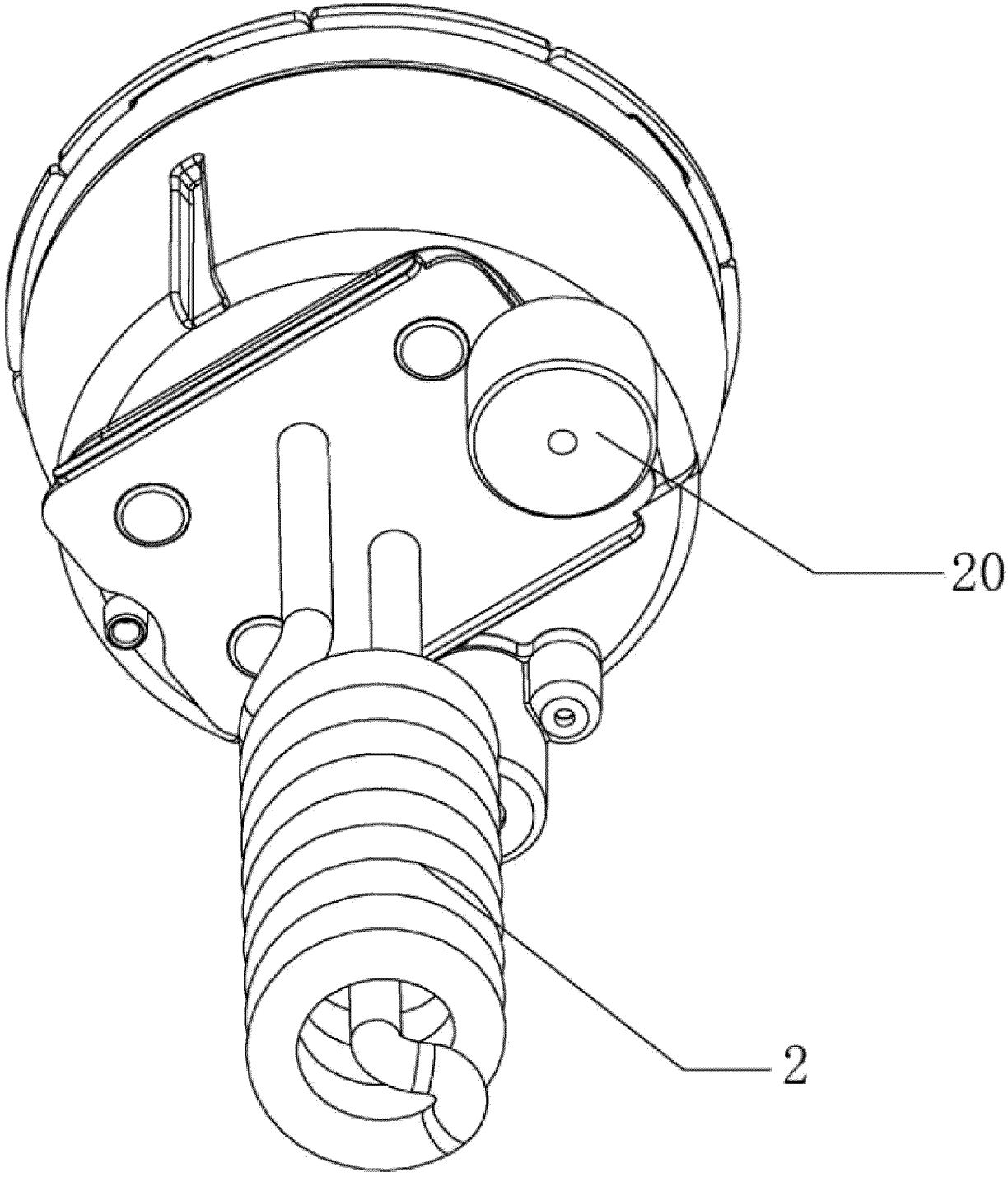

Figure 6

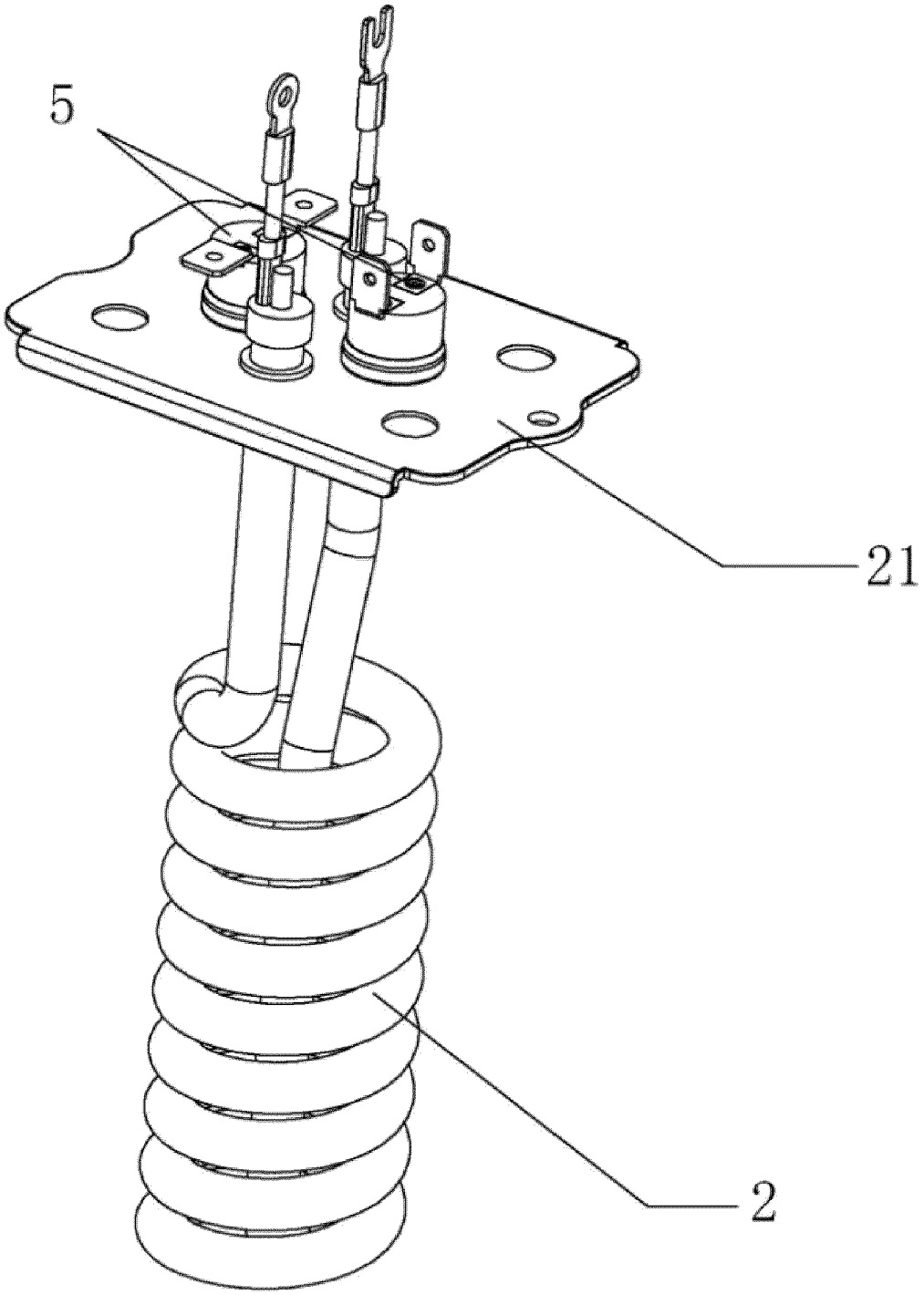

Figure 7

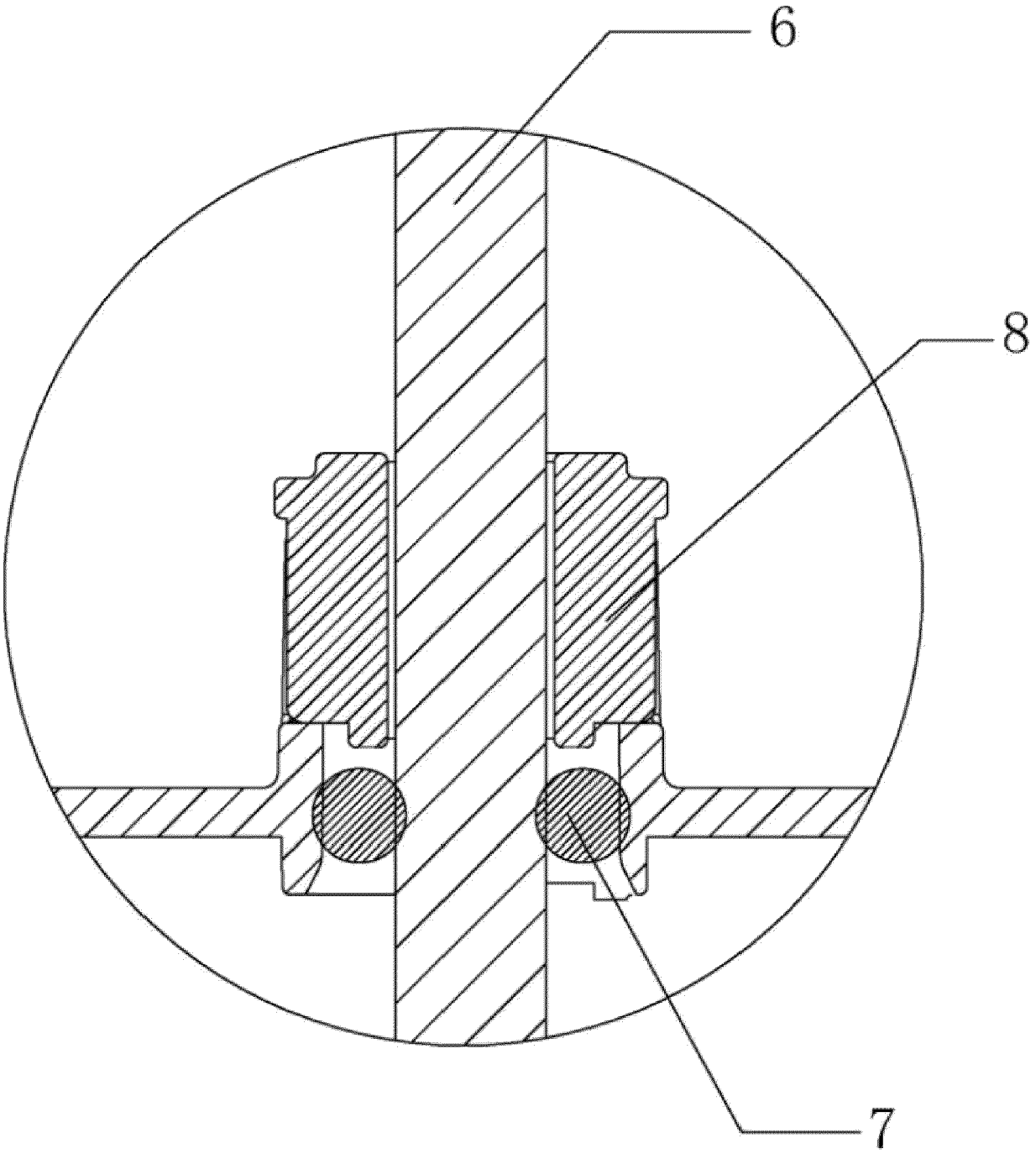

Figure 8

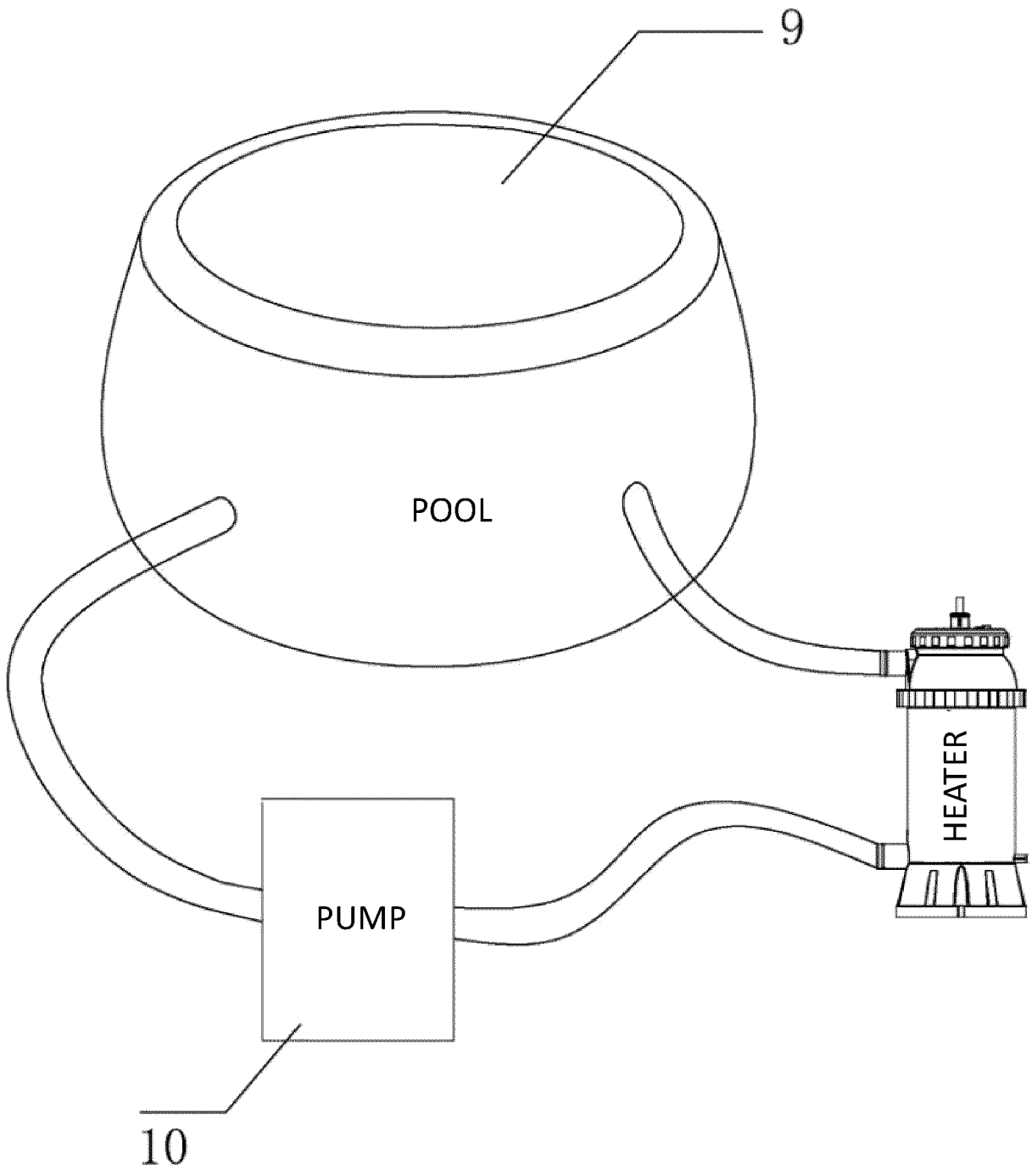

Figure 9

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EUROPEAN SEARCH REPORT

Application Number
EP 22 21 6621

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	CN 2 931 674 Y (INTEX IND XIAMEN CO LTD [CN]) 8 August 2007 (2007-08-08) * page 5, lines 1-6; figures 2,5 *	1-12	INV. E04H4/12
A	US 2020/024860 A1 (GEORGOFF PATRICK [US] ET AL) 23 January 2020 (2020-01-23) * claim 5; figures 1,2 *	1-12	

TECHNICAL FIELDS SEARCHED (IPC)

E04H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	9 May 2023	Rosborough, John

CATEGORY OF CITED DOCUMENTS

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 2931674 Y	08-08-2007	NONE	
US 2020024860 A1	23-01-2020	NONE	

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82