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(54) **BALLAST THROWING APPARATUS USED FOR DEEP-SEA MANNED SUBMERSIBLE**

(57) The present application relates to a ballast discarding device for a full-sea deep manned submersible, including an outer cylinder and an inner cylinder arranged concentrically, wherein the outer cylinder and the inner cylinder are connected respectively by a plurality of mounting brackets, a first cavity with an opening is formed between the inner wall of the outer cylinder and the inner wall of the inner cylinder, and a second cavity with an opening is formed inside the inner cylinder; the bottoms of the outer cylinder and the inner cylinder are together connected with a turning plate provided with a hole, one end of the turning plate is hinged with a first hinged support, and the other end of the turning plate is connected with a hanging mechanism hinged to a third hinged support; and the turning plate is also provided with a sliding mechanism for opening and closing the hole of the turning plate, the movable end of the sliding mechanism is connected with the output end of a power mechanism, and the power mechanism is arranged at the bottom of the turning plate. The present application is simple in structure and convenient to use. Lead shots with a diameter of 20 mm or less are used as ballasts, which can be purchased at low prices in the market without processing. Furthermore, due to the large density of lead, the volume of the whole set of device is reduced.

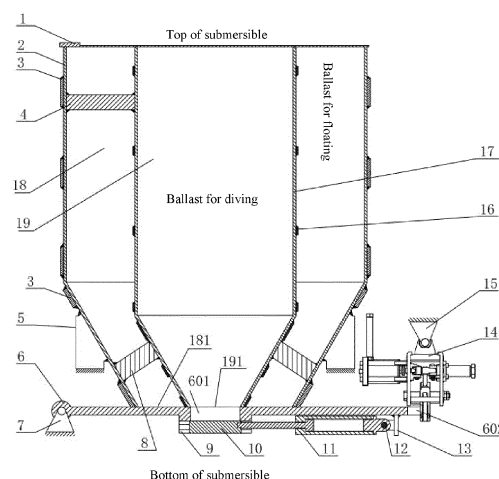


FIG. 2

Description

TECHNICAL FIELD

[0001] The present application relates to the field of submersibles, and particularly relates to a ballast discarding device for a full-sea deep manned submersible.

BACKGROUND

[0002] A deep-sea manned submersible is an important apparatus for efficient marine exploration, scientific investigation and development operations. The deep-sea manned submersible can carry marine scientists into the depths of the ocean, and they can directly observe, analyze and evaluate the seabed site, and can also operate various operating tools to realize efficient operations. At present, China has two large-depth manned submersibles, namely "Jiao Long" and "Shen Hai Yong Shi", with working depths of 7000 m and 4500 m respectively, wherein "Jiao Long" is the deepest manned submersible in the world at present.

[0003] In order to save energy, the deep-sea manned submersible generally adopts unpowered diving and floating modes. In the process of diving, the weight of the submersible is greater than the underwater buoyancy of the submersible, so the submersible dives by virtue of the underwater negative buoyancy. When the submersible dives to approach the preset working depth, a set of ballasts are discarded by the ballast discarding device, and at this time, the underwater weight and buoyancy of the submersible are basically balanced, so the submersible can perform underwater operations. When the submersible completes the underwater operations, the submersible discards another set of ballasts by the ballast discarding device, and at this time, the underwater buoyancy of the submersible is greater than the gravity of the submersible, so the submersible floats to the water surface by virtue of underwater positive buoyancy.

SUMMARY

Technical Problems

[0004] Due to the particularity of manned deep diving, for safety reasons, deployment, operation and recovery are usually performed during the day. Since the full-sea deep manned submersible works at a depth of ten thousand meters, if the diving and floating speeds are not fast enough, the two processes of floating and diving will take up a lot of time, and less time is left for underwater operations. This is unfavorable for the full-sea deep manned submersible which is expensive to dive. Therefore, it is extremely important for the full-sea deep manned submersible to obtain as high as possible floating and diving speeds. At present, the floating and diving speeds of the deep-sea manned submersible mainly come from the carrying and discarding of heavy ballasts, and a little

speed comes from measures such as the operation of a vertical thruster, the optimization of a shape for the reduction of resistance. Therefore, for deep-sea manned submersibles, the ballasts are designed to be heavy. At present, ballast discarding mechanisms used for deep-sea manned submersibles are all heavy-block ballast discarding mechanisms, most of the ballasts are of cuboid structures, and lifting lugs are arranged on the cuboid structures to realize mounting. For example, such mechanisms include patent title "Deep-sea Heavy Object Hanging and Discarding Device" (patent number: 201810761883), patent title "Ballast Discarding Device for Deep-sea Submersible" (patent number: 201410163451), and patent title "Hanging and Releasing Mechanism for Heavy Ballast Blocks" (patent number: 200720037765.8).

[0005] The ballast in the above cuboid structure is generally spliced by cut rectangular iron/lead plates, and the surface is painted with anti-rust paint. Compared with the deep-sea manned submersible having a working depth of several kilometers, the full-sea deep manned submersible has a greater working depth, and the deeper the seawater, the greater the seawater density, the greater the buoyancy of the submersible, and the greater the loss of the diving speed. In order to obtain high floating and diving speeds, the ballast of the full-sea deep manned submersible is designed to be heavier, so the processing cost of the cuboid ballast becomes extremely high. Especially as a consumable, the ballast will be discarded on the seabed during each dive. In the total life cycle of a full-sea deep manned submersible (thousands of dives), the huge processing cost of ballasts will bring great difficulties to the daily operation and maintenance of the submersible.

Solutions

Technical Solutions

[0006] A ballast discarding device for a full-sea deep manned submersible includes an outer cylinder and an inner cylinder arranged concentrically, wherein the outer cylinder and the inner cylinder are connected respectively by a plurality of mounting brackets, a first cavity with an opening is formed between the inner wall of the outer cylinder and the inner wall of the inner cylinder, and a second cavity with an opening is formed inside the inner cylinder; the bottoms of the outer cylinder and the inner cylinder are together connected with a turning plate provided with a hole, one end of the turning plate is hinged with a first hinged support, and the other end of the turning plate is connected with a hanging mechanism hinged to a third hinged support; and the turning plate is also provided with a sliding mechanism for opening and closing the hole of the turning plate, the movable end of the sliding mechanism is connected with the output end of a power mechanism, and the power mechanism is arranged at the bottom of the turning plate.

[0007] Further technical solutions are as follows:

The tops of the outer cylinder and the inner cylinder are coplanar with each other, and the bottoms of the outer cylinder and the inner cylinder are coplanar with each other; the upper halves of both the outer cylinder and the inner cylinder are of cylindrical structures, and the lower halves of both the outer cylinder and the inner cylinder are of conical structures; a plurality of inner cylinder upper mounting brackets are uniformly distributed between the cylindrical structure of the outer cylinder and the cylindrical structure of the inner cylinder, and a plurality of inner cylinder lower mounting brackets are uniformly distributed between the conical structure of the outer cylinder and the conical structure of the inner cylinder;

both the inner cylinder upper mounting brackets and the inner cylinder lower mounting brackets are of strip-shaped structures, every two adjacent inner cylinder upper mounting brackets are centered on the inner cylinder and are uniformly distributed at an angle of 120° , and every two adjacent inner cylinder lower mounting brackets are also centered on the inner cylinder and are uniformly distributed at an angle of 60° ;

the tops of the outer cylinder and the inner cylinder are together provided with a cover body, and the cover body is of a circular structure;

a plurality of outer cylinder reinforcing rings are mounted on the outer walls of the upper half and the lower half of the outer cylinder from top to bottom, and a plurality of inner cylinder reinforcing rings are mounted on the outer walls of the upper half and the lower half of the inner cylinder from top to bottom;

the bottom of the first cavity is opened to form an annular hole, and the bottom of the second cavity is opened to form a second circular hole;

the turning plate includes a circular plate, strip-shaped plates are formed symmetrically along the periphery of the circular plate and are extended outward, the end of one of the strip-shaped plates is provided with a hinged support hole hinged with the first hinged support, the end of the other strip-shaped plate is provided with a cylindrical rod for connecting the hanging mechanism, the circular plate is provided with a first circular hole, and the circular hole constitutes the hole of the turning plate;

the sliding mechanism includes a pair of rails fixedly connected to the bottom of the turning plate, the inner side of each rail is recessed to form a female connection notch, a pair of male connection bosses of

an orifice opening and closing control plate are matched between a pair of female connection notches, and the orifice opening and closing control plate constitutes the movable end of the sliding mechanism; and

the distance between the turning plate and the bottom of the submersible is 1.5-2 times the length of the turning plate.

Beneficial Effects of the Present Invention

Beneficial Effects

[0008] The present application is simple in structure and convenient to use. Lead shots with a diameter of 20 mm or less are used as ballasts, which can be purchased at low prices in the market without processing. Due to the large density of lead, the volume of the whole set of device is reduced. In addition, for a traditional heavy-block ballast discarding mechanism, a diving ballast is discarded at a time. If the counterweight of the ballast is not accurate enough, after the diving ballast is discarded, a buoyancy finely-adjusting system needs to be started to finely adjust the buoyancy to ensure that the submersible approaches the seabed at a low speed. However, ballasts for diving in the present application are continuously discarded, and the discarding speed is controllable, so the above defects are avoided. Furthermore, compared with a cuboid ballast of the same weight, lead shots with a diameter of 20 mm or less are used as ballasts which are more convenient to mount.

BRIEF DESCRIPTION OF THE DRAWINGS

Description of the Drawings

[0009]

FIG. 1 is a top view of the present application.

FIG. 2 is a schematic diagram of a cross-sectional structure of the present application in a direction A-A.

FIG. 3 is a schematic diagram of a cross-sectional structure of the present application in a direction B-B.

FIG. 4 is a schematic structural diagram of a turning plate in the present application.

FIG. 5 is an arrangement diagram of mounting brackets between an outer cylinder and an inner cylinder in the present application.

FIG. 6 is a working principle diagram of discarding a diving ballast in the present application.

FIG. 7 is a working principle diagram of discarding

a floating ballast in the present application.

[0010] 1 denotes cover body; 2 denotes outer cylinder; 3 denotes outer cylinder reinforcing ring; 4 denotes inner cylinder upper mounting bracket; 5 denotes mounting base; 6 denotes turning plate; 601 denotes first circular hole; 602 denotes cylindrical rod; 603 denotes hinged support hole; 604 denotes circular plate; 7 denotes first hinged support; 8 denotes inner cylinder lower mounting bracket; 9 denotes rail; 901 denotes female connection notch; 10 denotes orifice opening and closing control plate; 1001 denotes male connection boss; 11 denotes oil cylinder; 12 denotes pin shaft; 13 denotes second hinged support; 14 denotes hanging mechanism; 15 denotes third hinged support; 16 denotes inner cylinder reinforcing ring; 17 denotes inner cylinder; 18 denotes first cavity; 181 denotes annular hole; 19 denotes second cavity; 191 denotes second circular hole.

DETAILED DESCRIPTION

[0011] As shown in FIG. 1 to FIG. 5, a ballast discarding device for a full-sea deep manned submersible includes an outer cylinder 2 and an inner cylinder 17 arranged concentrically; both the outer cylinder 2 and the inner cylinder 17 above are mounted at the center of gravity of the submersible, so the discarding of floating and diving ballasts will not have a large impact on the attitude of the submersible; the outer cylinder 2 and the inner cylinder 17 are connected respectively by a plurality of mounting brackets, a first cavity 18 with an opening is formed between the inner wall of the outer cylinder 2 and the inner wall of the inner cylinder 17, and a second cavity 19 with an opening is formed inside the inner cylinder 17; the bottom of the first cavity 18 is opened to form an annular hole 181, and the bottom of the second cavity 19 is opened to form a second circular hole 191; the bottoms of the outer cylinder 2 and the inner cylinder 17 are together connected with a turning plate 6 provided with a hole, one end of the turning plate 6 is hinged with a first hinged support 7, and the other end of the turning plate 6 is connected with a hanging mechanism 14 hinged to a third hinged support 15; and the turning plate 6 is also provided with a sliding mechanism for opening and closing the hole of the turning plate 6, the movable end of the sliding mechanism is connected with the output end of a power mechanism, and the power mechanism is arranged at the bottom of the turning plate 6. In the present embodiment, an oil cylinder 11 is used as the power mechanism, and the tail of the oil cylinder 11 is hinged with a second hinged support 13 by a pin shaft 12.

[0012] As shown in FIG. 1 to FIG. 3, the tops of the outer cylinder 2 and the inner cylinder 17 are coplanar with each other, and the bottoms of the outer cylinder 2 and the inner cylinder 17 are coplanar with each other; the upper halves of both the outer cylinder 2 and the inner cylinder 17 are of cylindrical structures, and the lower halves of both the outer cylinder 2 and the inner cylinder

17 are of conical structures; and a plurality of inner cylinder upper mounting brackets 4 are uniformly distributed between the cylindrical structure of the outer cylinder 2 and the cylindrical structure of the inner cylinder 17, and a plurality of inner cylinder lower mounting brackets 8 are uniformly distributed between the conical structure of the outer cylinder 2 and the conical structure of the inner cylinder 17. As shown in FIG. 2 and FIG. 5, both the inner cylinder upper mounting brackets 4 and the inner cylinder lower mounting brackets 8 are of strip-shaped structures, every two adjacent inner cylinder upper mounting brackets 4 are centered on the inner cylinder 17 and are uniformly distributed at an angle of 120°, and every two adjacent inner cylinder lower mounting brackets 8 are also centered on the inner cylinder 17 and are uniformly distributed at an angle of 60°. As shown in FIG. 2, a mounting base 5 is further provided, one end of the mounting base 5 is welded with the conical structure of the outer cylinder 2, and the other end of the mounting base is in threaded connection with a submersible frame.

[0013] As shown in FIG. 1 to FIG. 2, the tops of the outer cylinder 2 and the inner cylinder 17 are together provided with a cover body 1, the cover body 1 is of a circular structure, and the top of the cover body 1 is flush with the top of the submersible. A plurality of outer cylinder reinforcing rings 3 are mounted on the outer walls of the upper half and the lower half of the outer cylinder 2 from top to bottom, and a plurality of inner cylinder reinforcing rings 16 are mounted on the outer walls of the upper half and the lower half of the inner cylinder 17 from top to bottom.

[0014] As shown in FIG. 4, the turning plate 6 includes a circular plate 604, strip-shaped plates are formed symmetrically along the periphery of the circular plate 604 and are extended outward, the end of one of the strip-shaped plates is provided with a hinged support hole 603 hinged with the first hinged support 7, the end of the other strip-shaped plate is provided with a cylindrical rod 602 for connecting the hanging mechanism 14, the circular plate 604 is provided with a first circular hole 601, and the first circular hole 601 constitutes the hole of the turning plate 6. The distance between the turning plate 6 and the bottom of the submersible is 1.5-2 times the length of the turning plate 6, and there is no obstruction under the turning plate 6 on the submersible.

[0015] As shown in FIG. 3, the sliding mechanism includes a pair of rails 9 fixedly connected to the bottom of the turning plate 6, the inner side of each rail 9 is recessed to form a female connection notch 901, a pair of male connection bosses 1001 of an orifice opening and closing control plate 10 are matched between a pair of female connection notches 901, and the orifice opening and closing control plate 10 constitutes the movable end of the sliding mechanism.

[0016] The present application implements the mounting of lead shot type ballasts by the following steps:

1) as shown in FIG. 6, lead shots with a diameter of

20 mm or less in bags are purchased in the market, and each bag of lead shots is 30 kg or less and can be carried by a normal adult; 2) the hanging mechanism 14 is enabled to be in a hanging state, and the orifice opening and closing control plate 10 completely covers the first circular hole 601 of the turning plate 6; and 3) a worker climbs to the top of the submersible, opens the cover body 1, pours the lead shots in bags into the first cavity 18 and the second cavity 19 respectively according to the calculated weight, and then locks the cover body 1.

[0017] The principle of discarding a ballast for diving in the present application is as follows:

as shown in FIG. 6, a piston rod of the oil cylinder 11 retracts to drive the male connection bosses 1001 of the orifice opening and closing control plate 10 to move along the female connection notches 901 of the rails 9, the first circular hole 601 is gradually opened, and the lead shots in the second cavity 19 are released under the action of gravity. The discarding speed of the diving ballast can be controlled by controlling the retracting degree of the piston rod and the holding time of the retracting state.

[0018] The principle of discarding a ballast for floating in the present application is as follows:

as shown in FIG. 7, the hanging mechanism 14 is enabled to be in a released state, under the action of the self-gravity and the lead shots, the turning plate 6 is turned around the first hinged support 7, and under the action of gravity, the lead shots in the first cavity 18 are all discarded at a time. The specific structure of the hanging mechanism 14 in the present application is the same as a hanging structure in patent title *Hanging and Releasing Mechanism for Heavy Ballast Blocks* (patent number: 2007200377658).

[0019] The present application is simple in structure and convenient to use. Lead shots with a diameter of 20 mm or less are used as ballasts, which can be purchased at low prices in the market without processing. Due to the large density of lead, the volume of the whole set of device is reduced. In addition, the program of starting a buoyancy finely-adjusting system to finely adjust the buoyancy to ensure that the submersible approaches the seabed at a low speed after a diving ballast in a traditional heavy-block ballast discarding mechanism is discarded is omitted. Furthermore, compared with a cuboid ballast of the same weight, lead shots with a diameter of 20 mm or less are used as ballasts which are more convenient for maintenance personnel to mount ballasts.

Claims

1. A ballast discarding device for a full-sea deep manned submersible, comprising an outer cylinder (2) and an inner cylinder (17) arranged concentrically, wherein the outer cylinder (2) and the inner cylinder (17) are connected respectively by a plurality

of mounting brackets, a first cavity (18) with an opening is formed between the inner wall of the outer cylinder (2) and the inner wall of the inner cylinder (17), and a second cavity (19) with an opening is formed inside the inner cylinder (17); the bottoms of the outer cylinder (2) and the inner cylinder (17) are together connected with a turning plate (6) provided with a hole, one end of the turning plate (6) is hinged with a first hinged support (7), and the other end of the turning plate (6) is connected with a hanging mechanism (14) hinged to a third hinged support (15); and the turning plate (6) is also provided with a sliding mechanism for opening and closing the hole of the turning plate (6), the movable end of the sliding mechanism is connected with the output end of a power mechanism, and the power mechanism is arranged at the bottom of the turning plate (6).

2. The ballast discarding device for a full-sea deep manned submersible according to claim 1, wherein the tops of the outer cylinder (2) and the inner cylinder (17) are coplanar with each other, and the bottoms of the outer cylinder (2) and the inner cylinder (17) are coplanar with each other; the upper halves of both the outer cylinder (2) and the inner cylinder (17) are of cylindrical structures, and the lower halves of both the outer cylinder (2) and the inner cylinder (17) are of conical structures; and a plurality of inner cylinder upper mounting brackets (4) are uniformly distributed between the cylindrical structure of the outer cylinder (2) and the cylindrical structure of the inner cylinder (17), and a plurality of inner cylinder lower mounting brackets (8) are uniformly distributed between the conical structure of the outer cylinder (2) and the conical structure of the inner cylinder (17).

3. The ballast discarding device for a full-sea deep manned submersible according to claim 2, wherein both the inner cylinder upper mounting brackets (4) and the inner cylinder lower mounting brackets (8) are of strip-shaped structures, every two adjacent inner cylinder upper mounting brackets (4) are centered on the inner cylinder (17) and are uniformly distributed at an angle of 120°, and every two adjacent inner cylinder lower mounting brackets (8) are also centered on the inner cylinder (17) and are uniformly distributed at an angle of 60°.

4. The ballast discarding device for a full-sea deep manned submersible according to any one of claims 1-3, wherein the tops of the outer cylinder (2) and the inner cylinder (17) are together provided with a cover body (1), and the cover body (1) is of a circular structure.

5. The ballast discarding device for a full-sea deep manned submersible according to claim 2, wherein

a plurality of outer cylinder reinforcing rings (3) are mounted on the outer walls of the upper half and the lower half of the outer cylinder (2) from top to bottom, and a plurality of inner cylinder reinforcing rings (16) are mounted on the outer walls of the upper half and the lower half of the inner cylinder (17) from top to bottom.

6. The ballast discarding device for a full-sea deep manned submersible according to claim 1, wherein the bottom of the first cavity (18) is opened to form an annular hole (181), and the bottom of the second cavity (19) is opened to form a second circular hole (191).
7. The ballast discarding device for a full-sea deep manned submersible according to claim 1, wherein the turning plate (6) comprises a circular plate (604), strip-shaped plates are formed symmetrically along the periphery of the circular plate (604) and are extended outward, the end of one of the strip-shaped plates is provided with a hinged support hole (603) hinged with the first hinged support (7), the end of the other strip-shaped plate is provided with a cylindrical rod (602) for connecting the hanging mechanism (14), the circular plate (604) is provided with a first circular hole (601), and the circular hole (601) constitutes the hole of the turning plate (6).
8. The ballast discarding device for a full-sea deep manned submersible according to claim 1, wherein the sliding mechanism comprises a pair of rails (9) fixedly connected to the bottom of the turning plate (6), the inner side of each rail (9) is recessed to form a female connection notch (901), a pair of male connection bosses (1001) of an orifice opening and closing control plate (10) are matched between a pair of female connection notches (901), and the orifice opening and closing control plate (10) constitutes the movable end of the sliding mechanism.
9. The ballast discarding device for a full-sea deep manned submersible according to claim 8, wherein the distance between the turning plate (6) and the bottom of the submersible is 1.5-2 times the length of the turning plate (6).

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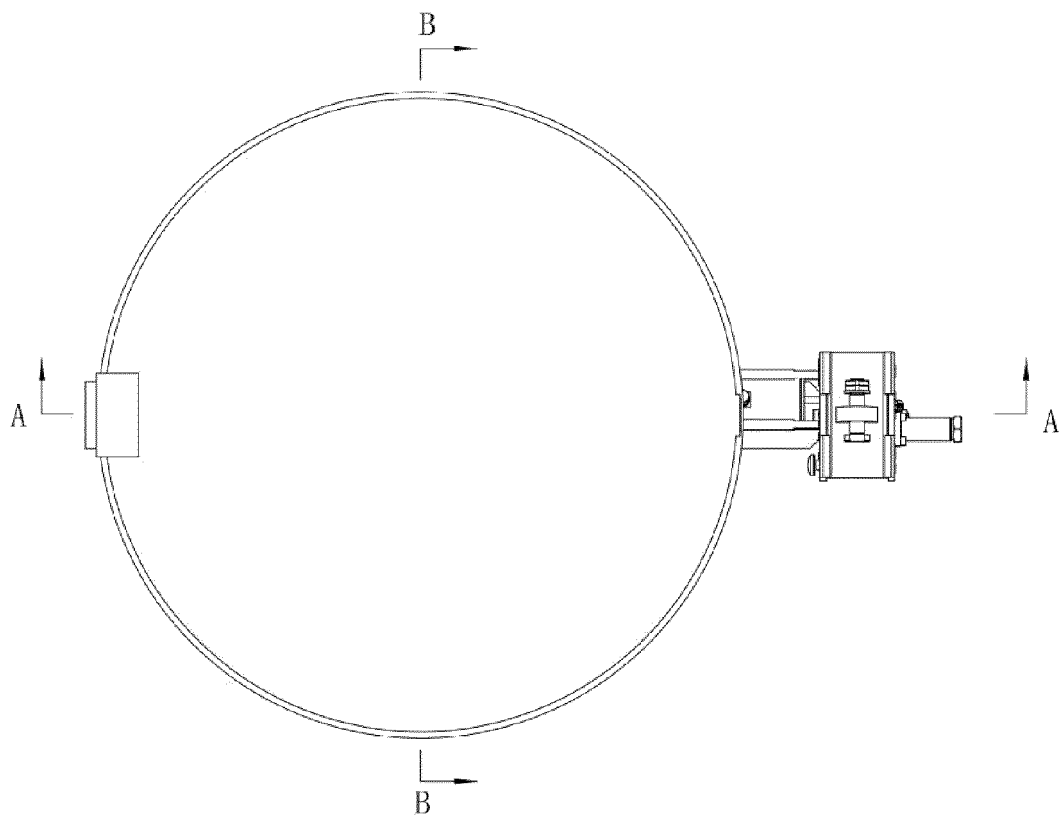


FIG. 1

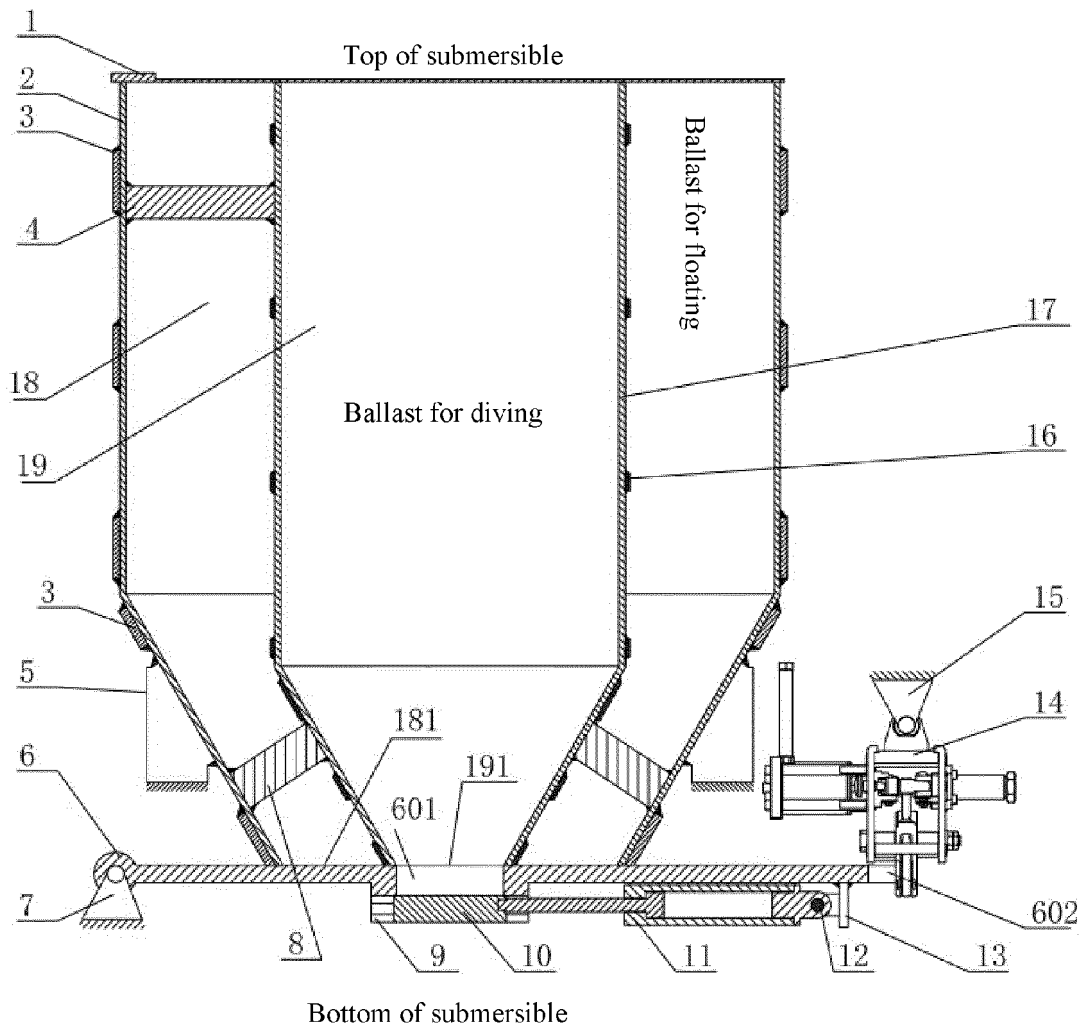


FIG. 2

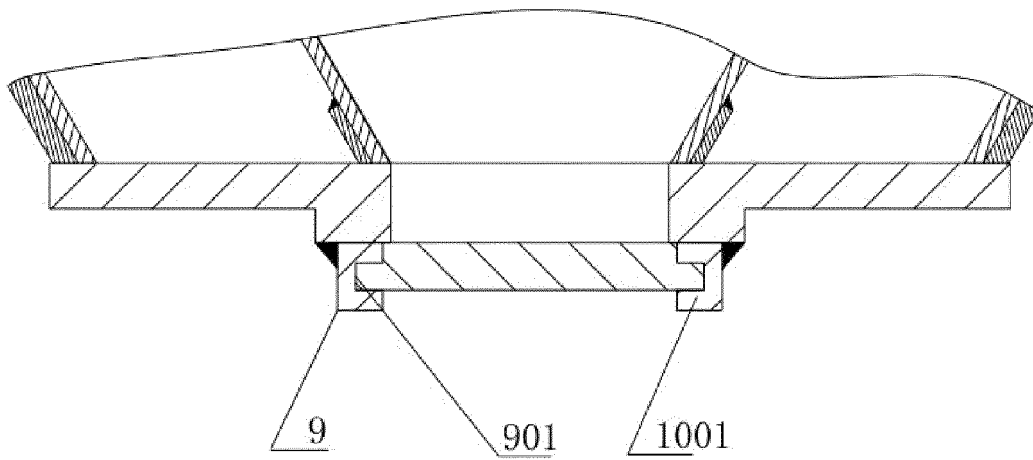


FIG. 3

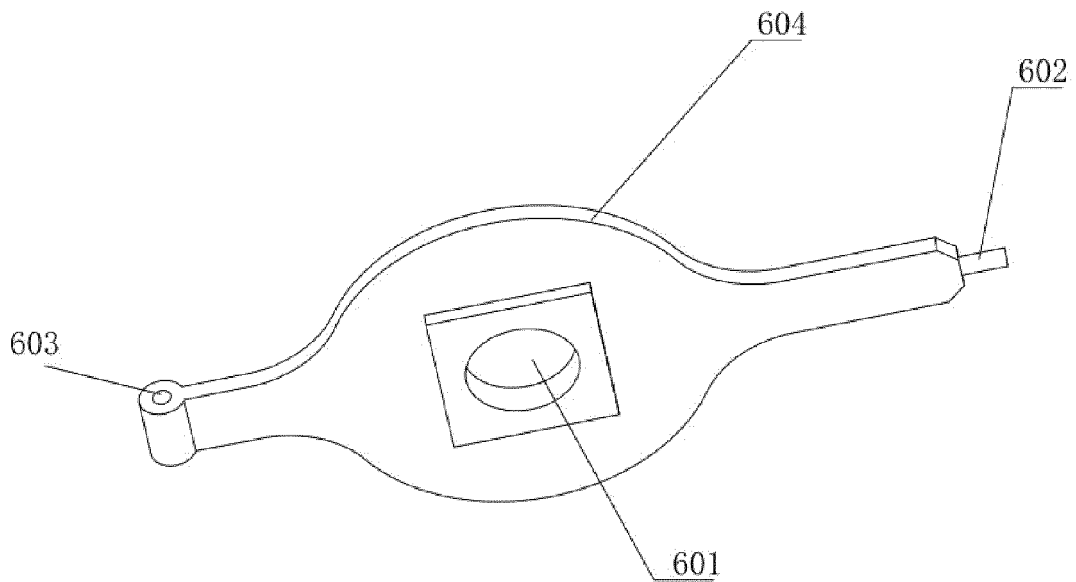


FIG. 4

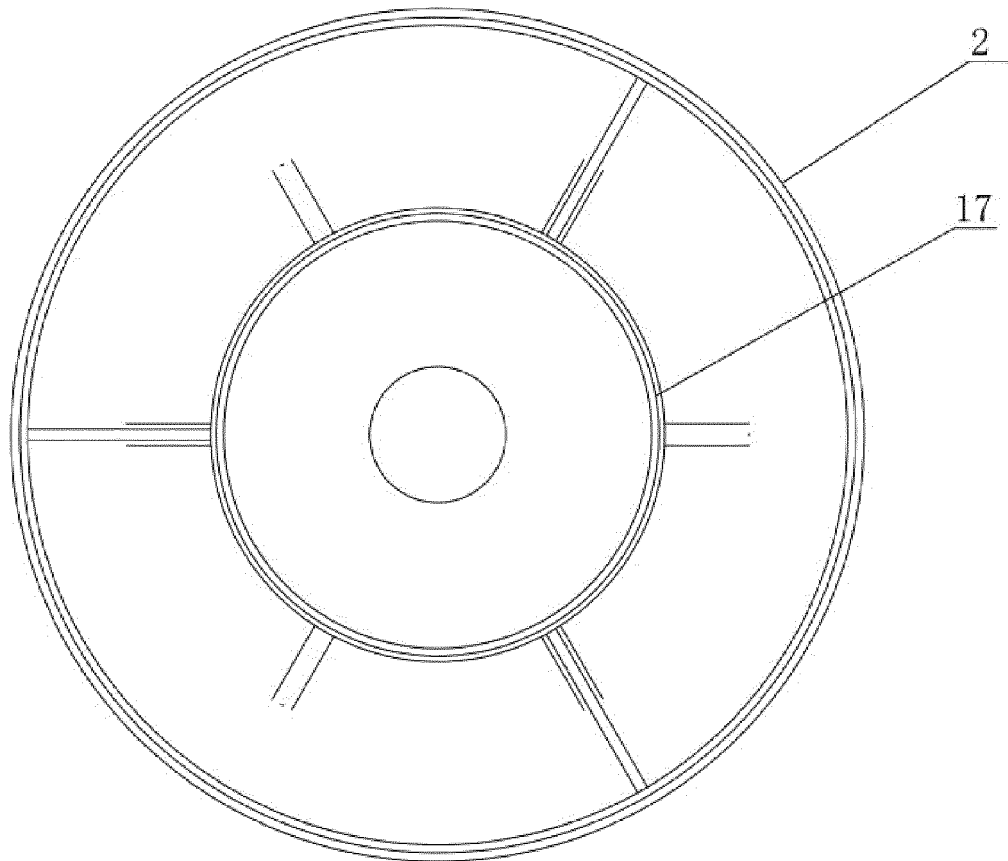


FIG. 5

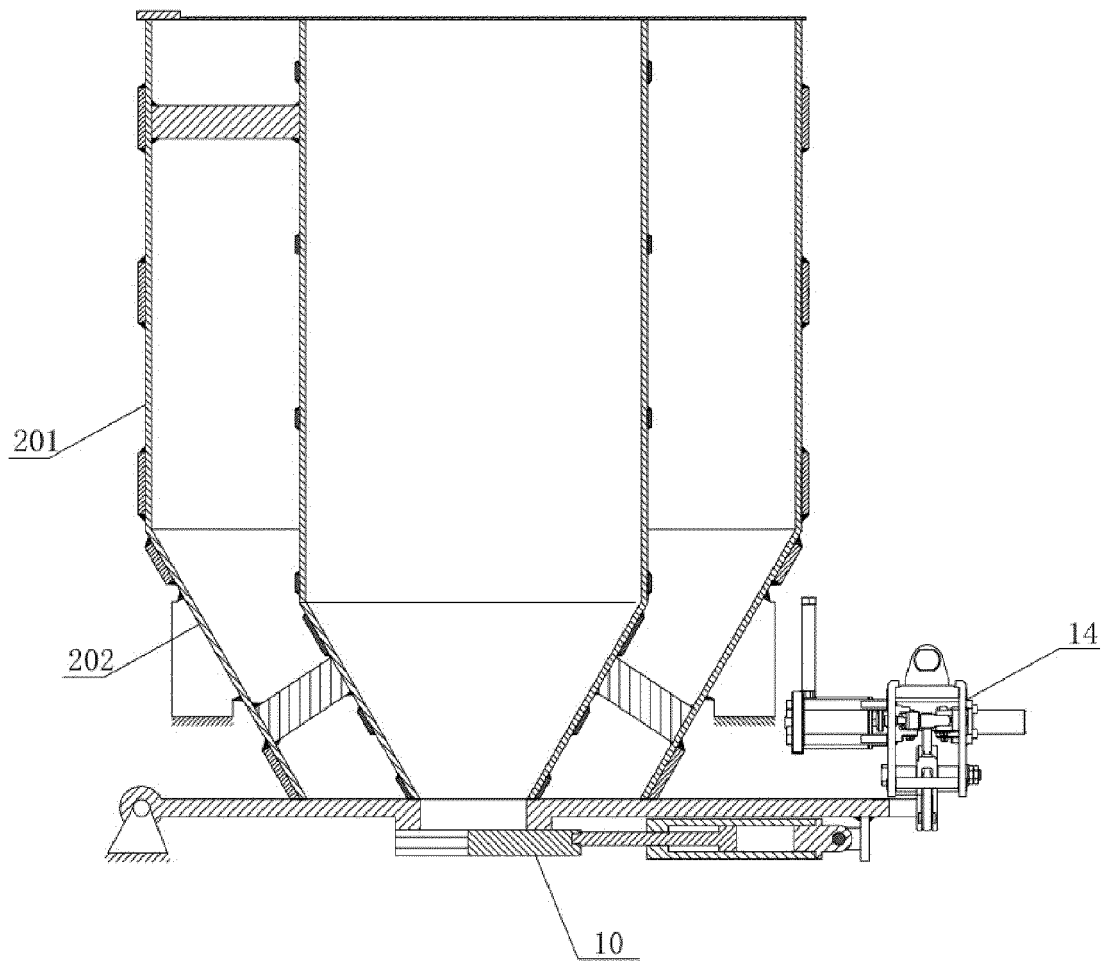


FIG. 6

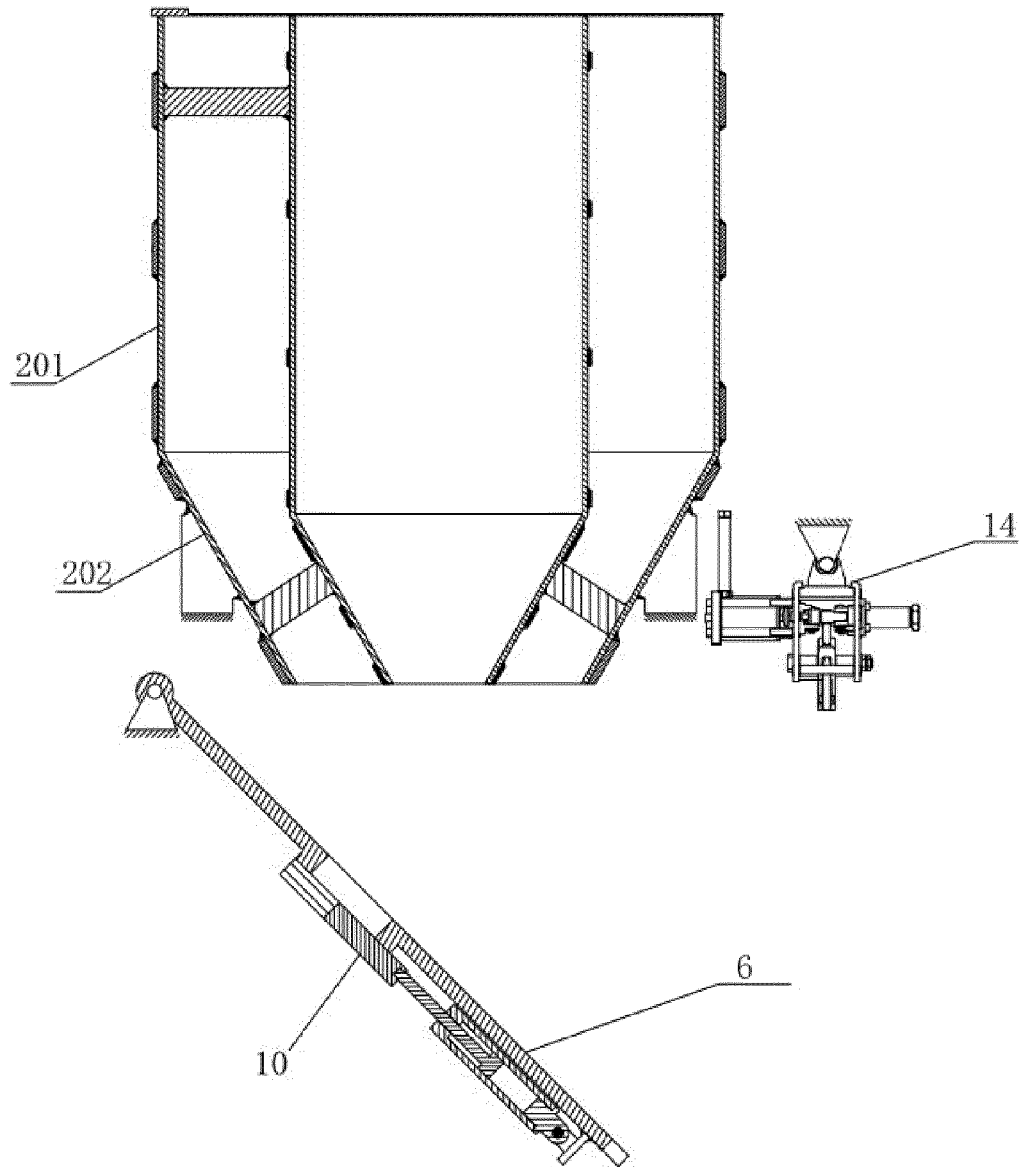


FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2019/090657

A. CLASSIFICATION OF SUBJECT MATTER B63G 8/24(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) B63G; B63C Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched																					
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) CNABS, CNTXT, CNKI: 潜水器, 压载, 重物, 卸载, 抛弃, 球, VEN, EPTXT, USTXT, WOTXT: submercible, ballast, weight, release, discard, eject, ball.																					
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 109733572 A (CHINA SHIP SCIENTIFIC RESEARCH CENTER (NO. 702 INSTITUTE OF CHINA SHIPBUILDING INDUSTRY CORPORATION)) 10 May 2019 (2019-05-10) claims 1-9</td> <td>1-9</td> </tr> <tr> <td>A</td> <td>JP H08127391 A (KOKUSAI DENSHIN DENWA CO., LTD.) 21 May 1996 (1996-05-21) description, paragraphs [0011]-[0021], and figures 1 and 2</td> <td>1-9</td> </tr> <tr> <td>A</td> <td>CN 201058661 Y (NO. 702 INSTITUTE OF CHINA SHIPBUILDING INDUSTRY CORPORATION) 14 May 2008 (2008-05-14) entire document</td> <td>1-9</td> </tr> <tr> <td>A</td> <td>CN 208278302 U (SHANGHAI OCEAN UNIVERSITY) 25 December 2018 (2018-12-25) entire document</td> <td>1-9</td> </tr> <tr> <td>A</td> <td>JP H07309293 A (SUMITOMO ELECTRIC INDUSTRIES, LTD. et al.) 28 November 1995 (1995-11-28) entire document</td> <td>1-9</td> </tr> <tr> <td>A</td> <td>CN 108725718 A (SHANGHAI JIAO TONG UNIVERSITY) 02 November 2018 (2018-11-02) entire document</td> <td>1-9</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	PX	CN 109733572 A (CHINA SHIP SCIENTIFIC RESEARCH CENTER (NO. 702 INSTITUTE OF CHINA SHIPBUILDING INDUSTRY CORPORATION)) 10 May 2019 (2019-05-10) claims 1-9	1-9	A	JP H08127391 A (KOKUSAI DENSHIN DENWA CO., LTD.) 21 May 1996 (1996-05-21) description, paragraphs [0011]-[0021], and figures 1 and 2	1-9	A	CN 201058661 Y (NO. 702 INSTITUTE OF CHINA SHIPBUILDING INDUSTRY CORPORATION) 14 May 2008 (2008-05-14) entire document	1-9	A	CN 208278302 U (SHANGHAI OCEAN UNIVERSITY) 25 December 2018 (2018-12-25) entire document	1-9	A	JP H07309293 A (SUMITOMO ELECTRIC INDUSTRIES, LTD. et al.) 28 November 1995 (1995-11-28) entire document	1-9	A	CN 108725718 A (SHANGHAI JIAO TONG UNIVERSITY) 02 November 2018 (2018-11-02) entire document	1-9
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Name and mailing address of the ISA/CN China National Intellectual Property Administration (ISA/CN) No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088 China Facsimile No. (86-10)62019451	Authorized officer Telephone No.																				

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