(19) LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Économie

(11) N° de publication : **LU102688**

(12) **BREVET D'INVENTION** **B1**

(21) N° de dépôt: LU102688

(22) Date de dépôt: 23/03/2021

(51) Int. Cl.:
H01M 50/20, H01M 50/24

(30) Priorité:

(43) Date de mise à disposition du public: 23/09/2021

(47) Date de délivrance: 23/09/2021

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(54) **Marine high-efficiency thermal insulation battery compartment.**

(57) This invention provides a kind of marine high-efficiency thermal insulation battery compartment, which comprises upper spherical shell, spherical shell watertight plug-in interface, spherical shell threaded hole, end cap, end cap watertight plug-in interface, end cap threaded hole, baffle, outer cylinder, electric heating film insulation layer, inner cylinder, lower spherical shell, inner cylinder plug-in interface, support seat, spherical shell O-ring, outer cylinder O-ring, inner cylinder O-ring, polyurethane insulation layer. The present invention adopts a three-layer sleeve structure, the outermost layer has spherical shell structure, making the stress uniform, and both inner layers have cylindrical structures as well, which are convenient for adding thermal insulation materials and adding battery packs. This invention adopts the electric heating film insulation layer, so that the battery pack can discharge with high energy efficiency, and increases the working time of the detecting instrument of the submerged buoy system to collect more detailed ocean internal wave data.

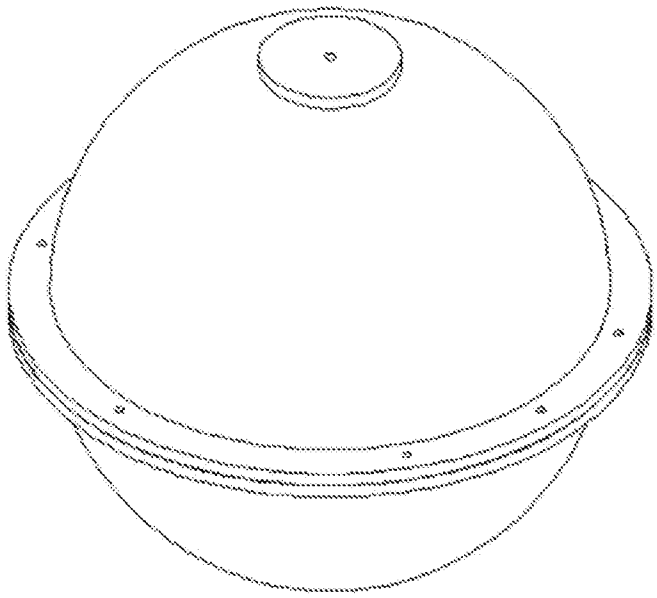

Fig. 1

DESCRIPTION

Marine high-efficiency thermal insulation battery compartment

TECHNICAL FIELD

The invention relates to the field of ocean pressure vessels, in particular to Marine high-efficiency thermal insulation battery compartment.

BACKGROUND

In the 21st century, with mankind's demand for energy increases, and land resources are gradually scarce. The scarcity of energy has awakened mankind's enthusiasm for exploring the ocean. It is the common sense that the ocean accounts for about 78% of the total area of the earth, however, human being knows very little about the ocean. Therefore, in order to expand the understanding to the ocean, it is necessary to use detecting instrument to survey the structure of the deep sea and the energy it reserves, for example, China's "Jiao long" unmanned submersible and submerged buoy system increases the understanding to the ocean, and these instruments have to work in the deep sea for a long time. In order for the detection instruments to complete the survey task efficiently, the energy supply device is essential. In deep sea, the water pressure is high and the temperature is low, which results in strict requirements for the energy supply device. The main energy supply source of the detection instrument is the battery, which has extremely low discharge efficiency in the low temperature environment.The main energy supply source of the detection instrument is the battery, and the battery has extremely low discharge efficiency in the low temperature environment. Therefore, in order to ensure the discharge efficiency of the battery, the structure of the battery compartment must be designed. The existing marine battery compartment does not attend to the insulation of the battery, it rather focuses on improving the battery based on the positive and negative chemical reaction principle of the battery, which wastes time and effort and resources. However, the discharge efficiency of the battery can be realized by improving the internal structure of the battery compartment, which, contrasting to the existing art, is simple and conserve resources.

SUMMARY

This invention provides Marine high-efficiency thermal insulation battery compartment, which enables to provide efficient and long term electricity to detecting instrument of the submerged buoy system.

In order to achieve the purpose described above, this invention provides the following technological scheme:

A Marine high-efficiency thermal insulation battery compartment comprises upper spherical shell, spherical shell watertight plug-in interface, spherical shell threaded hole, end cap, end cap watertight plug-in interface, end cap threaded hole, baffle, outer cylinder, electric heating film insulation layer, inner cylinder, lower spherical shell, inner cylinder plug-in interface, support seat, spherical shell O-ring, outer cylinder O-ring, inner cylinder O-ring, polyurethane insulation layer. The described upper spherical shell and lower spherical shell constitute the external pressure-resistant part of the battery compartment together, which is made of 316L stainless steel and can withstand pressure of 10Mpa, meaning it can work in depth of 1000m under water, and this part is in direct contact with seawater, electric energy is supplied to the detecting instrument of the detecting instrument of the submerged buoy system through the spherical shell watertight plug-in interface, the upper spherical shell is connected with the lower spherical shell by spherical shell threaded hole, the described spherical shell O-ring is used for sealing.

the described outer cylinder is an inner constituent part of thermal insulation battery compartment, inside of outer cylinder, there are electric heating film insulation layer and inner cylinder, the latter is divided into upper and lower parts by baffle, the upper part has battery packs that supply electricity to he detecting instrument of the submerged buoy system through end cap watertight plug-in interface, the lower part as well has battery packs that supplies electricity to electric heating film insulation layer through inner cylinder plug-in interface, thus preserving the temperature that battery packs need for functioning to improve the discharge efficiency of the battery packs, which results in increasing the working time of the detecting instrument of the submerged buoy system to collect more detailed ocean internal wave data.

The described end cap and outer cylinder and inner cylinder constitute a double-layer cylindrical heat preservation structure that is fixed by end cap threaded hole , and uses the described outer cylinder O-ring and inner cylinder O-ring to seal the double-layer cylindrical heat preservation structure .

The described support seat is used to fix the double-layer cylindrical heat preservation structure, the described polyurethane insulation layer can both have thermal effects and provide fixture to the double-layer cylindrical heat preservation structure at the same time, preventing the thermal insulation battery compartment from shaking due to the influence of ocean currents in the process of lowering to the deep sea.

This invention has advanced structure with buoyancy that can withstanding 1000m water pressure, it can provide high-efficient power with stability.

By adopting the above technical scheme, the invention has the advantages described as below:

Compared with battery compartment of the existing art, this invention adopts a three-layer sleeve structure, the outermost layer is a spherical shell structure, which makes the stress uniform, and the inner two layers are cylindrical structures, which is convenient for adding thermal insulation materials and adding battery packs.

The electric heating film insulation layer is adopted, which enables the battery pack to discharge with high energy efficiency, increases the working time of the detecting instrument of the submerged buoy system, and collects more detailed ocean internal wave data. Polyurethane insulation layer is adopted on the outer cylinder, which further prevents the heat loss of the battery compartment, and ensures the battery compartment to supply power for the submarine target detection instrument for a long time and with high efficiency.

Marine high-efficiency thermal insulation battery compartment has sound structure, and is easy for manufacturing with low cost.

BRIEF DESCRIPTION OF THE FIGURES

Fig. 1 is a schematic diagram of the left and right equiangular axial side structure of the present invention.

Fig. 2 is a sectional view of that structure of the present invention.

In figures: upper spherical shell 1, spherical shell watertight plug-in interface 2, spherical shell threaded hole 3, end cap 4, end cap watertight plug-in interface 5, end cap threaded hole 6, baffle 7, outer cylinder 8, electric heating film insulation layer 9, inner cylinder 10, lower spherical shell 11, inner cylinder plug-in interface 12, support seat 13, spherical shell O-ring 14, outer cylinder O-ring 15, inner cylinder O-ring 16, polyurethane insulation layer 17.

DESCRIPTION OF THE INVENTION

In order to make the object, technical scheme and advantages of the present invention clearer, the present invention will be further described in detail with reference to the accompanying drawings.

Referring to Fig.1 and Fig. 2. Fig.1 is a schematic diagram of the left and right equiangular shaft side structure of the present invention. Fig. 2 is a sectional view of the structure of the present invention.

.The described Marine high-efficiency thermal insulation battery compartment comprises upper spherical shell 1, spherical shell watertight plug-in interface 2, spherical shell threaded hole 3, end cap 4, end cap watertight plug-in interface 5, end cap threaded hole 6, baffle 7, outer cylinder 8, electric heating film insulation layer 9, inner cylinder 10, lower spherical shell 11, inner cylinder plug-in interface 12, support seat 13, spherical shell O-ring 14, outer cylinder O-ring 15, inner cylinder O-ring 16, polyurethane insulation layer 17, the described upper spherical shell 1 and lower spherical shell 11 constitute the external pressure-resistant part of the battery compartment together, which is made of 316L stainless steel and can withstand pressure of 10Mpa, meaning it can work in depth of 1000m under water, and this part is in direct contact with seawater, electric energy is supplied to the detecting instrument of the detecting instrument of the submerged buoy system through the spherical shell watertight plug-in interface 2, the upper spherical shell 1 is connected with the lower spherical shell (11) by spherical shell threaded hole 3, the described spherical shell O-ring 14 is used for sealing. the described outer cylinder 8 is an inner constituent part of thermal insulation battery compartment, inside of outer cylinder 8,

there are electric heating film insulation layer 9 and inner cylinder 10, the latter is divided into upper and lower parts by baffle 7, the upper part has battery packs that supply electricity to he detecting instrument of the submerged buoy system through end cap watertight plug-in interface 5, the lower part as well has battery packs that supplies electricity to electric heating film insulation layer 9 through inner cylinder plug-in interface 12, thus preserving the temperature that battery packs need for functioning to improve the discharge efficiency of the battery packs, which results in increasing the working time of the detecting instrument of the submerged buoy system to collect more detailed ocean internal wave data. The described end cap 4 and outer cylinder 8 and inner cylinder 10 constitute a double-layer cylindrical heat preservation structure that is fixed by end cap threaded hole 6, and uses the described outer cylinder O-ring 15 and inner cylinder O-ring 16 to seal the double-layer cylindrical heat preservation structure. The described support seat 13 is used to fix the double-layer cylindrical heat preservation structure, the described polyurethane insulation layer 17 can both have thermal effects and provide fixture to the double-layer cylindrical heat preservation structure at the same time, preventing the thermal insulation battery compartment from shaking due to the influence of ocean currents in the process of lowering to the deep sea.

CLAIMS:

1. Marine high-efficiency thermal insulation battery compartment is characterized in comprising upper spherical shell 1, spherical shell watertight plug-in interface 2, spherical shell threaded hole 3, end cap 4, end cap watertight plug-in interface 5, end cap threaded hole 6, baffle 7, outer cylinder 8, electric heating film insulation layer 9, inner cylinder 10, lower spherical shell 11, inner cylinder plug-in interface 12, support seat 13, spherical shell O-ring 14, outer cylinder O-ring 15, inner cylinder O-ring 16, polyurethane insulation layer 17, the described upper spherical shell 1 and lower spherical shell 11 constitute the external pressure-resistant part of the battery compartment together, which is made of 316L stainless steel and can withstand pressure of 10Mpa, meaning it can work in depth of 1000m under water, and this part is in direct contact with seawater, electric energy is supplied to the detecting instrument of the detecting instrument of the submerged buoy system through the spherical shell watertight plug-in interface 2, the upper spherical shell 1 is connected with the lower spherical shell 11 by spherical shell threaded hole 3, the described spherical shell O-ring 14 is used for sealing.

2. According to claim 1, marine high-efficiency thermal insulation battery compartment is characterized in that the described outer cylinder 8 is an inner constituent part of thermal insulation battery compartment, inside of outer cylinder 8, there are electric heating film insulation layer 9 and inner cylinder 10, the latter is divided into upper and lower parts by baffle 7, the upper part has battery packs that supply electricity to he detecting instrument of the submerged buoy system through end cap watertight plug-in interface 5, the lower part as well has battery packs that supplies electricity to electric heating film insulation layer 9 through inner cylinder plug-in interface 12, thus preserving the temperature that battery packs need for functioning to improve the discharge efficiency of the battery packs, which results in increasing the working time of the detecting instrument of the submerged buoy system to collect more detailed ocean internal wave data.

3. According to claim 1, marine high-efficiency thermal insulation battery compartment is characterized in that the described end cap 4 and outer cylinder 8 and inner cylinder 10 constitute a double-layer cylindrical heat preservation structure that is fixed by end cap threaded hole 6, and uses the described outer cylinder O-ring 15

and inner cylinder O-ring 16 to seal the double-layer cylindrical heat preservation structure .

4. According to claim 1, marine high-efficiency thermal insulation battery compartment is characterized in that the described support seat 13 is used to fix the double-layer cylindrical heat preservation structure, the described polyurethane insulation layer 17 can both have thermal effects and provide fixture to the double-layer cylindrical heat preservation structure at the same time, preventing the thermal insulation battery compartment from shaking due to the influence of ocean currents in the process of lowering to the deep sea.

REVENDICATIONS

1. Un compartiment de batterie d'isolation thermique marine à haute efficacité, caractérisé par le fait qu'il comprend la coque sphérique supérieure (1), l'interface enfichable étanche de la coque sphérique (2), le trou fileté de la coque sphérique (3), le couvercle d'extrémité (4), l'interface enfichable étanche du couvercle d'extrémité (5), le trou fileté du couvercle d'extrémité (6), le déflecteur (7), le cylindre externe (8), la couche d'isolation de film de chauffage électrique (9), le cylindre interne (10), la coque sphérique inférieure (11), l'interface enfichable du cylindre interne (12), le siège de support (13), le joint torique de la coque sphérique (14), le joint torique du cylindre externe (15), le joint torique du cylindre interne (16), et la couche d'isolation en polyuréthane (17) ; la coque sphérique supérieure (1) et la coque sphérique inférieure (11) constituent ensemble la partie externe résistante à la pression du compartiment de batterie, fabriquée en acier inoxydable 316 L et capable de supporter une pression de 10 Mpa, c'est-à-dire que lors du fonctionnement à une profondeur de 1000 m sous l'eau, cette partie entre en contact direct avec l'eau de mer, l'énergie électrique est fournie à l'instrument de détection du système de bouée immergée à travers l'interface enfichable étanche de la coque sphérique (2) ; la coque sphérique supérieure (1) est reliée à la coque sphérique inférieure (11) à travers le trou fileté de la coque sphérique (3), et le joint torique de la coque sphérique(14) agit comme un joint d'étanchéité.

2. Le compartiment de batterie d'isolation thermique marine à haute efficacité décrit dans la revendication 1 est caractérisé par le fait que le cylindre externe (8) est la partie interne du compartiment de batterie d'isolation thermique, comprenant à l'intérieur la couche d'isolation de film de chauffage électrique (9) et le cylindre interne (10), ce dernier est divisé en parties supérieure et inférieure par le déflecteur (7) ; la partie supérieure est équipée de batteries pour fournir de l'électricité à l'instrument de détection du système de bouée immergée à travers l'interface enfichable étanche du couvercle d'extrémité (5) ; la partie inférieure est également équipée de batteries pour fournir de l'électricité à la couche d'isolation de film de chauffage électrique (9) à travers l'interface enfichable du cylindre interne (12), conservant ainsi la température des batteries nécessaire au fonctionnement pour améliorer l'efficacité de décharge des batteries, et augmenter le temps de fonctionnement de l'instrument de détection du

système de bouées submergées afin de collecter des données plus détaillées sur les vagues internes de l'océan.

3. Le compartiment de batterie d'isolation thermique marine à haute efficacité décrit dans la revendication 1 est caractérisé par le fait que le couvercle d'extrémité (4), le cylindre externe (8) et le cylindre interne (10) constituent une structure cylindrique d'isolation thermique à double couche, qui est fixée à travers le trou fileté du couvercle d'extrémité (6), et est scellé avec le joint torique du cylindre externe (15) et le joint torique du cylindre interne (16).

4. Le compartiment de batterie d'isolation thermique marine à haute efficacité décrit dans la revendication 1 est caractérisé par le fait que le siège de support (13) est utilisé pour fixer la structure cylindrique d'isolation thermique à double couche ; la couche d'isolation en polyuréthane (17) permet de fixer en même temps la structure cylindrique d'isolation thermique à double couche en jouant le rôle d'isolation thermique, ce qui empêche que le compartiment de batterie d'isolation thermique tremble sous l'impact des courants océaniques pendant la descente en mer profonde.

FIGURES

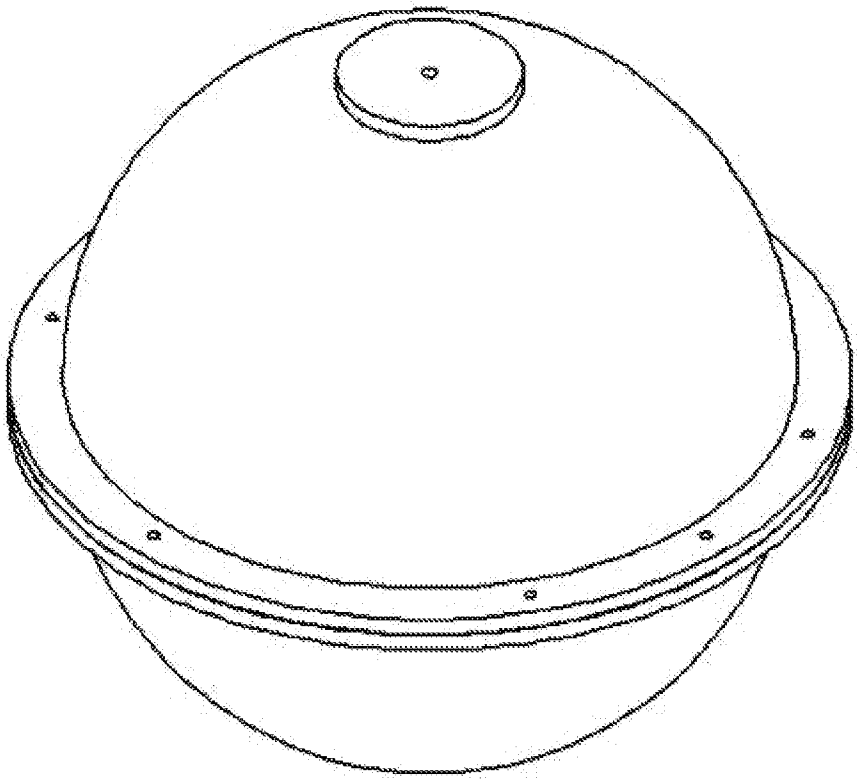

Fig. 1

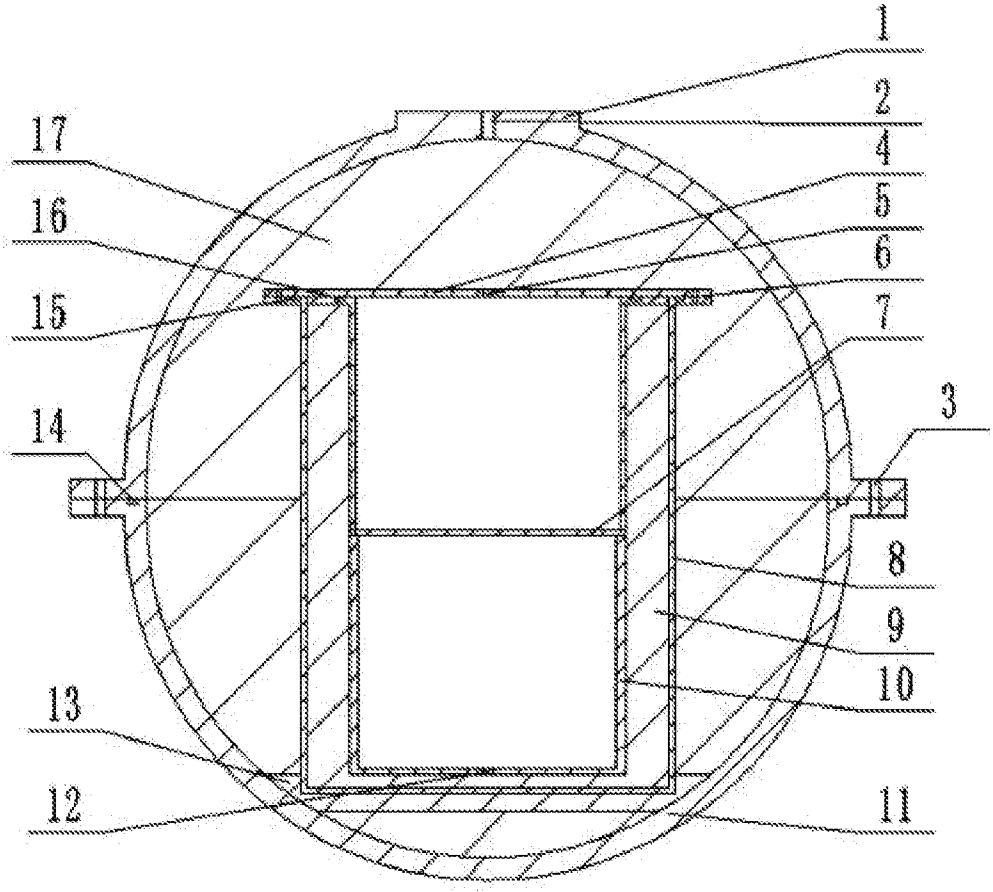

Fig. 2