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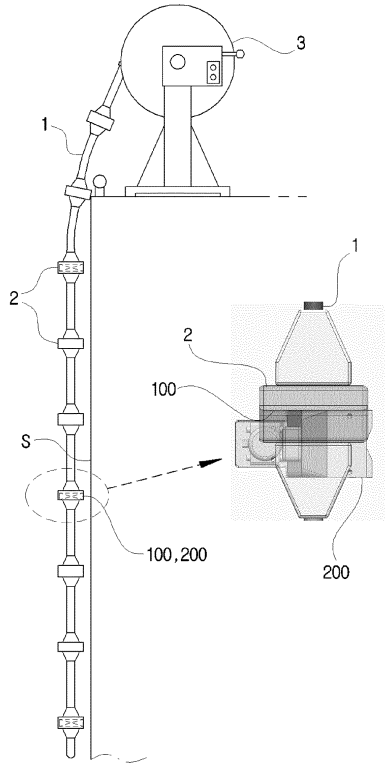
(54) PILOT LADDER HAVING REMOTE ATTACHMENT/DETACHMENT FUNCTION

(57) The purpose of the present invention is to provide a pilot ladder having a remote attachment/detachment function that can safely fix, by using magnetic force, a ladder for a pilot who safely guides a ship to an inner harbor. The present invention relates to a pilot ladder having a remote attachment/detachment function, which comprises a rope (1) and multiple steps (2) and is installed on the outer place of a hull so as to be used when a pilot embarks and disembarks, the pilot ladder comprising: a compartment (100) formed on the bottom surface of each of the steps (2); a magnetic switch magnet module (200) installed in the compartment (100) and provided to be attached to the outer plate (S) of the hull; and a wireless controller (300) provided to control the on/off operations of the magnetic switch manet module (200). In case of using the pilot ladder having a remote attachment/detachment function, a magnetic switch magnet has an improved structure in which the magnetic switch magnet is integrated with a step and the on/off operations thereof are controlled by the wireless controller, and thus an existing wire configuration for magnet control is omitted, so that management required for ladder winding storage is easy, and malfunction of the magnetic switch magnet due to damage to a wire can be prevented.

FIG. 2



EP 4 293 191 A1

Description

Technical Field

[0001] The present invention relates to a pilot ladder having a remote attachment/detachment function, more specifically to a pilot ladder having a remote attachment/detachment function that is capable of being safely fixed to a ship through magnetic forces so that a pilot who climbs the ladder safely guides the ship to an inner harbor.

Background Art

[0002] In a process where a large ship is at anchor, generally, the ship may collide against the reef around a harbor, which threatens the safety of the ship, and to prevent such collision, a pilot embarks and disembarks in and from the ship coming into a harbor from sea and setting sail so that he or she safely guides the ship to the harbor. In this case, a pilot ladder is used to embark and disembark the pilot.

[0003] In this case, the pilot ladder is generally used for embarkation and disembarkation for the persons concerned, such as pilots or quarantine officers, and since the pilot ladder with a length of 10 to 20 m is installed, it may seriously swing, so that when the pilot embarks and disembarks, safety accidents such as fall from the pilot ladder may frequently happen.

[0004] One of conventional pilot ladders is disclosed in Korean Patent No. 10-1412215, and the conventional pilot rope ladder, comprising two pieces of rope joined to each other by a plurality of steps spaced apart from one another at given intervals, is wound onto a rope ladder winding device installed on a deck when it is kept and is unwound from the rope ladder winding device if necessary. In this case, the steps having magnets attached to the outer plates of the hull and the steps having no magnets are arranged alternately, and otherwise, magnetic switch roller magnets are installed on the undersides of both sides of the rope to freely produce or eliminate the magnetic forces of permanent magnets built therein through switch control, so that when the rope ladder is wound from the top of the deck, the magnetic switch roller magnets roll along the outer plates of the hull.

[0005] Another conventional pilot ladder is disclosed in Korean Utility Model Registration No. 20-0359752, and the conventional wire rope ladder, comprising two pieces of wire rope having loops formed on tops thereof and a plurality of steps spaced apart from one another at given intervals in such a way as to be fixed between the two pieces of wire rope. In this case, the both side loops have hooks connected thereto by hinges and thus locked onto the front ends of the hull blocks, and the plurality of steps have electromagnets mounted thereon to attach the wire rope ladder to the hull blocks by the magnetic forces generated from the electromagnets. Further, loop-shaped wire holders are fixed to the entire length of one side wire rope to hold a wire for supplying power to the electromagnets onto the wire rope, and the wire, which is branchedly connected to branch wires for supplying the power to the electromagnets and has the front end connected to a plug, is held onto the wire holders.

[0006] In the case of the conventional technologies, the magnetic switch roller magnets (electromagnets) are mounted on the steps to allow the ladder to be fixedly attached to the outer plates of the hull, and otherwise, the magnetic switch roller magnets (electromagnets) are connected to one another by the wire to receive the power supplied thereto. As a result, it is inconvenient to wind and keep the ladder because of the arrangement of the wire, and while the pilot climbs up and down the ladder, the wire may hinder the pilot from climbing up and down the ladder. Besides, if the wire is locked onto the pilot's body and thus damaged, power supply is stopped, and accordingly, the fixed state of the ladder is immediately released to cause safety accidents.

Disclosure

Technical Problem

[0007] Accordingly, the present invention has been made in view of the above-mentioned problems occurring in the related art, and it is an object of the present invention to provide a pilot ladder having a remote attachment/detachment function that is capable of allowing magnetic switch magnets to be provided integrally with steps in such a way as to be controlled in on/off operations by a wireless controller, so that since the existing wire configuration for magnet control is omitted, the management required for ladder winding and keeping can be easily performed, and the malfunctions of the magnetic switch magnets due to damage to a wire can be prevented, thereby safely protecting a worker (pilot) from safety accidents.

Technical Solution

[0008] To accomplish the above-mentioned objects, according to the present invention, a pilot ladder having a remote attachment/detachment function, comprising two pieces of rope (1) and a plurality of steps (2) for connecting the two pieces of rope (1) to each other, may include: a compartment (100) formed to the shape of a concave recess on the bottom or side surface of each step (2); a magnetic switch magnet module (200) installed in the compartment (100) in such a way as to be attached to an outer plate (S) of the hull; and a wireless controller (300) for controlling on/off operations of the magnetic switch magnet module (200), wherein the magnetic switch magnet module (200) may include a housing (212) disposed in the compartment (100), a magnetic switch magnet (210) supported against the housing (212), a driver (230) operating with the power of a battery (220) to control the on/off operations of the magnetic

switch magnet (210), and a communication module connected to the driver (230) to receive an output signal from the wireless controller (300).

[0009] In this case, the driver (230) may include a motor and a gear assembly, the motor being controlled in on/off operations by means of the communication module receiving the output signal from the wireless controller (300), and the magnetic switch magnet module (200) may have a ground sensor (240) disposed on the surface attached to the outer plate (S) of the hull, the ground sensor (240) being adapted to detect whether the magnetic switch magnet (210) comes into close contact with the outer plate (S) of the hull so that the detected value thereof is transmitted to the wireless controller (300) through the communication module, and after an on signal of the magnetic switch magnet (210) has been outputted from the wireless controller (300), if the detected value of the ground sensor (240) is a contact off signal, a notification signal is outputted.

[0010] Further, each step (2) may have load sensing units (250) mounted thereon to detect whether a pilot climbs the pilot ladder, and the load sensing units (250) may include through holes (2a) formed on both ends of each step (2) to pass the two pieces of rope (1) therethrough, stoppers (252) fitted to the rope (1) with a given gap to support the step (2), and load sensors (254) disposed on bottoms of the through holes (2a) corresponding to the stoppers (252) to detect the load applied to the step (2), so that if a pilot climbing signal on the step (2) is detected through the calculation of the detected values of the load sensors (254), the off operation through which the magnetic force of the magnetic switch magnet (210) is released is inactivated by the wireless controller (300).

[0011] Furthermore, the protruding distances of the magnetic switch magnets (210) of the magnetic switch magnet modules (200) from the steps (2) may be adjusted by means of extension units (260), and each extension unit (260) may include: a rod hole (261) formed in the housing (212); a rod (262) expanding and contracting along the rod hole (261), having a plurality of rack gears (262a) formed on the outer peripheral surface thereof, and allowing the end portion to be coupled to the magnetic switch magnet (210) by means of a hinge; attracting means (263) disposed on the rod (262) or the magnetic switch magnet (210) to attract the protruding magnet (210) toward the step (2); and a key block (264) disposed in the housing (212) to protrude upwardly by a key driver (264a) in such a way as to engage with the corresponding rack gear (262a) to fix the rod (262) in position.

Advantageous Effects

[0012] According to the present invention, the pilot ladder having a remote attachment/detachment function allows the magnetic switch magnets to be provided integrally with the steps in such a way as to be controlled in on/off operations by the wireless controller, so that since the existing wire configuration for magnet control is omitted, the management required for ladder winding and keeping can be easily performed, and the malfunctions of the magnetic switch magnets due to damage to a wire can be prevented, thereby safely protecting the worker (pilot) from safety accidents.

Brief Description of Drawings

[0013]

FIG. 1 is a schematic view showing an overall configuration of a pilot ladder having a remote attachment/detachment function state according to the present invention.

FIG. 2 is a side view showing the pilot ladder having a remote attachment/detachment function according to the present invention.

FIG. 3 is an enlarged view showing a magnetic switch magnet module of the pilot ladder having a remote attachment/detachment function according to the present invention.

FIG. 4 is a sectional view showing a ground sensor of the pilot ladder having a remote attachment/detachment function according to the present invention

FIG. 5 is a sectional view showing a load sensor of the pilot ladder having a remote attachment/detachment function according to the present invention.

FIG. 6 is a side view showing an extension unit of the pilot ladder according to the present invention.

Best Mode for Invention

[0014] Hereinafter, the present invention will now be described in detail with reference to the attached drawings. When it is said that one element is described as being "connected" or "coupled" to the other element, one element may be directly connected or coupled to the other element, but it should be understood that another element may be present between the two elements.

[0015] FIG. 1 is a schematic view showing an overall configuration of a pilot ladder having a remote attachment/detachment function state according to the present invention, and FIG. 2 is a side view showing the pilot ladder according to the present invention, wherein a magnetic switch magnet module of the pilot ladder is enlarged.

[0016] The present invention relates to a pilot ladder having a remote attachment/detachment function, which comprises two pieces of rope 1 and a plurality of steps 2 and is wound on a winding device 3 installed on a hull in such a way as to be unwound when it is necessary. The pilot ladder according to the present invention includes compartments 100, magnetic switch magnet modules 200, and a wireless controller 300 so that the magnetic switch magnet modules 200 are provided integrally with the steps 2 in such a way as to be controlled in on/off operations by the wireless controller 300, thereby being easy to be kept and managed and enabling a

pilot to safely embark and disembark.

[0017] According to the present invention, each compartment 100 is formed to the shape of a concave recess on the underside or side of the corresponding step 2 to detachably attach the corresponding magnetic switch magnet module 200 thereto.

[0018] According to the present invention, the magnetic switch magnet modules 200 are disposed on the corresponding compartments 100 and thus attached to the outer plates S of the hull.

[0019] In this case, a magnetic switch represents a switch that freely produces (on) and eliminates (off) a permanent magnet built therein by means of switching operations.

[0020] The magnetic switch magnet modules 200 are spaced apart from one another on the plurality of steps 2, and FIGs. 1 and 2 show states where the magnetic switch magnet modules 200 are spaced apart from one another on the positions of numbers that are multiples of 3 of the plurality of steps 2.

[0021] Further, the wireless controller 300 is provided to control the on/off operations of the magnetic switch magnet modules 200.

[0022] The wireless controller 300 is provided as a dedicated remote controller. Otherwise, an application is built in a portable terminal and paired with the magnetic switch magnet modules 200, and next, the magnetic switch magnet modules 200 are controlled by the wireless controller 300.

[0023] Each magnetic switch magnet module 200 includes a housing 212 disposed in the compartment 100, a magnetic switch magnet 210 supported against the housing 212, a driver 230 operating with the power of a battery 220 to control the on/off operation of the magnetic switch magnet 210, and a communication module (not shown) connected to the driver 230 to receive an output signal from the wireless controller 300.

[0024] The driver 230 comprises a motor and a gear assembly, and the on/off operation of the motor is controlled by means of the communication module receiving the output signal from the wireless controller 300.

[0025] Like this, the magnetic switch magnet modules 200 are provided integrally with the steps 2 in such a way as to be controlled in on/off operations by the wireless controller 300, so that the existing wire configuration for magnet control is omitted to solve the problems of wire twisting or breakage when the pilot ladder is wound and kept, which ensures the pilot ladder according to the present invention can be stably used.

[0026] Further, only if some of the steps of the existing pilot ladder are replaced with the steps with which the magnetic switch magnet modules 200 are provided integrally, the existing pilot ladder can be stably used, without any swing, and therefore, the pilot ladder according to the present invention has high compatibility.

[0027] FIG. 4 is a sectional view showing a ground sensor of the pilot ladder having a remote attachment/detachment function according to the present invention, and the magnetic switch magnet modules 200 have ground sensors 240 disposed on the surfaces attached to the outer plates S of the hull.

[0028] Each ground sensor 240 serves to detect whether the magnetic switch magnet 210 comes into close contact with the corresponding outer plate S of the hull. That is, as shown in FIG. 4b, if the magnetic switch magnet 210 comes into close contact with the corresponding outer plate S of the hull, the ground sensor 240 is pressurized against the outer plate S of the hull, and in this case, a contact on signal is detected from the ground sensor 240.

[0029] Next, the detected value of the ground sensor 240 is transmitted to the wireless controller 300 through the communication module, and after the on signal of the magnetic switch magnet 210 has been outputted from the wireless controller 300, if the detected value of the ground sensor 240 is a contact off signal, a notification signal is outputted. The notification signal is any one or more selected from buzzer sounds, warning lights, and vibrations.

[0030] Accordingly, the ground sensors 240 simply detect whether the magnetic switch magnets 210 are attached to the outer plates S of the hull after the on signals of the magnetic switch magnets 210 have been outputted from the wireless controller 300, thereby completely preventing a danger in which a pilot climbs the ladder in a state where the magnetic switch magnets 210 are not attached to the outer plates S of the hull due to failure or malfunctions of the magnetic switch magnet modules 200.

[0031] FIG. 5 is a sectional view showing load sensing units 250 of the pilot ladder having a remote attachment/detachment function according to the present invention, and the load sensing units 250 are mounted on each step 2 to detect whether the pilot climbs up and down the ladder.

[0032] The load sensing units 250 include through holes 2a formed on both ends of each step 2 to pass the two pieces of rope 1 therethrough, stoppers 252 fitted to the rope 1 with a given gap to support the step 2, and load sensors 254 disposed on bottoms of the through holes 2a corresponding to the stoppers 252 to detect the load applied to the step 2.

[0033] In this case, each load sensor 254 is located between the step 2 and the stopper 252 to detect the load applied to the step 2. That is, the load sensor 254 detects the downwardly applied load to the step 2 when the pilot using the ladder stands up on the step 2 or pulls the step 2 with his or her hand.

[0034] If a pilot climbing signal on the step 2 is detected through the calculation of the detected values of the load sensors 254, the off operation through which the magnetic force of the magnetic switch magnet 210 is released is inactivated by the wireless controller 300, thereby preventing the off operation of the magnetic switch magnet 210 from occurring due to the control error of the wireless controller 300 that may happen during the pilot's climb-

ing.

[0035] To allow the step 2 to which the load sensing units 250 are applied to be mounted on the rope 1, further, both ends of the step 2 are dividedly provided with respect to the rope 1, as shown in FIG. 5a, in such a way as to allow the through holes 2a to be cut hemispherically, and the divided ends are detachably coupled to both ends of the step 2 by means of fastening members having bolts. Accordingly, the load sensing units 250 are simply applicable to the existing pilot ladders.

[0036] FIG. 6 is a side view showing extension units of the pilot ladder having a remote attachment/detachment function according to the present invention, and the protruding distances of the magnetic switch magnets 210 of the magnetic switch magnet modules 200 from the steps 2 are adjusted by means of the extension units 260.

[0037] Each extension unit 260 includes a rod hole 261 formed in the housing 212, a rod expanding and contracting along the rod hole 261, having a plurality of rack gears 262a formed on the outer peripheral surface thereof, and allowing the end portion to be coupled to the magnetic switch magnet 210 by means of a hinge, attracting means 263 disposed on the rod 262 or the magnetic switch magnet 210 to attract the protruding magnetic switch magnet 210 toward the step 2, and a key block 264 disposed in the housing 212 to protrude upwardly by a key driver 264a in such a way as to engage with the corresponding rack gear 262a to fix the rod 262 in position. FIG. 6 shows a tension spring as an example of the attracting means 263.

[0038] In a state where the pilot climbs down the ladder, the engagement between the key block 264 and the rack gear 262a is released through the key driver 264, and if the on operation signal of the magnetic switch magnet 210 is outputted from the wireless controller 300, the magnetic switch magnet 210 is attached to the hull by means of its magnetic force.

[0039] That is, as shown in enlarged portions of FIG. 6, the magnetic switch magnets 210 mounted onto the ends of the rods 262 protrude by distances between the steps 2 and the outer plates S of the hull in accordance with the curvature of the outer plates S and are thus attached to the outer plates S of the hull.

[0040] After that, the key drivers 264a operate under the control of the wireless controller 300 to allow the key blocks 264 to protrude, and the protruding key blocks 264 engage with the corresponding rack gears 262a of the rods 262 to fix the protruding positions of the magnetic switch magnets 210, thereby permitting the pilot to safely embark and disembark.

[0041] After the use of the pilot ladder, the magnetic switch magnets 210 are first off, and the attracting means 263 operate to allow the rods 262 to be completely inserted into the rod holes 261. Next, the pilot ladder is wound and stored.

[0042] Like this, the protruding lengths of the magnetic switch magnets 210 moving along the rods 262 are adjustable to allow the magnetic switch magnets 210 to be tightly attached to the outer plates S of the hull, irrespective of the curvature of the outer plates S of the hull, so that the installation area of the ladder can extend, and even if the outer plates S of the hull are curved or not flattened on surfaces, the steps 2 of the pilot ladder are fixed to the outer plates S of the hull in states of being vertical with respect to the surface of sea by means of the extension units 260, thereby enabling the pilot to safely embark and disembark.

[0043] Although specific embodiments have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art that any arrangement, which is calculated to achieve the same purpose, may be substituted for the specific embodiment shown. This application is intended to cover any adaptations or variations of the present invention. Therefore, it is manifestly intended that this invention be limited only by the claims and the equivalents thereof.

Industrial Applicability

[0044] The pilot ladder having a remote attachment/detachment function according to the present invention is configured to allow the magnetic switch magnets to be provided integrally with the steps, so that it is easy to perform the management required for ladder winding and storage and the pilot safely embarks and disembarks, thereby expecting the occurrence of a lot of demands in the related fields thereto.

Claims

1. A pilot ladder having a remote attachment/detachment function, comprising two pieces of rope (1) and a plurality of steps (2) for connecting the two pieces of rope (1) to each other, the pilot ladder comprising:

   a compartment (100) formed to the shape of a concave recess on the bottom or side surface of each step (2);
   a magnetic switch magnet module (200) installed in the compartment (100) in such a way as to be attached to an outer plate (S) of the hull; and
   a wireless controller (300) for controlling on/off operations of the magnetic switch magnet module (200),
   wherein the magnetic switch magnet module (200) comprises a housing (212) disposed in the compartment (100), a magnetic switch magnet (210) supported against the housing (212), a driver (230) operating with the power of a battery (220) to control the on/off operations of the magnetic switch magnet (210), and a communication module connected to the driver (230) to receive an output signal from the wireless controller (300).

2. The pilot ladder according to claim 1, wherein the driver (230) comprises a motor and a gear assembly, the motor being controlled in on/off operations by means of the communication module receiving the output signal from the wireless controller (300), and the magnetic switch magnet module (200) has a ground sensor (240) disposed on the surface attached to the outer plate (S) of the hull, the ground sensor (240) being adapted to detect whether the magnetic switch magnet (210) comes into close contact with the outer plate (S) of the hull so that the detected value thereof is transmitted to the wireless controller (300) through the communication module, and after an on signal of the magnetic switch magnet (210) has been outputted from the wireless controller (300), if the detected value of the ground sensor (240) is a contact off signal, a notification signal is outputted.

3. The pilot ladder according to claim 2, wherein each step (2) has load sensing units (250) mounted thereon to detect whether a pilot climbs the pilot ladder, and the load sensing units (250) comprise through holes (2a) formed on both ends of each step (2) to pass the two pieces of rope (1) therethrough, stoppers (252) fitted to the rope (1) with a given gap to support the step (2), and load sensors (254) disposed on bottoms of the through holes (2a) corresponding to the stoppers (252) to detect the load applied to the step (2), so that if a pilot climbing signal on the step (2) is detected through the calculation of the detected values of the load sensors (254), the off operation through which the magnetic force of the magnetic switch magnet (210) is released is inactivated by the wireless controller (300).

4. The pilot ladder according to claim 1 or 2, wherein the protruding distances of the magnetic switch magnets (210) of the magnetic switch magnet modules (200) from the steps (2) are adjusted by means of extension units (260), and each extension unit (260) comprises:

a rod hole (261) formed in the housing (212);
a rod (262) expanding and contracting along the rod hole (261), having a plurality of rack gears (262a) formed on the outer peripheral surface thereof, and allowing the end portion to be coupled to the magnetic switch magnet (210) by means of a hinge;
attracting means (263) disposed on the rod (262) or the magnetic switch magnet (210) to attract the protruding magnet (210) toward the step (2); and
a key block (264) disposed in the housing (212) to protrude upwardly by a key driver (264a) in such a way as to engage with the corresponding rack gear (262a) to fix the rod (262) in position.

FIG. 1

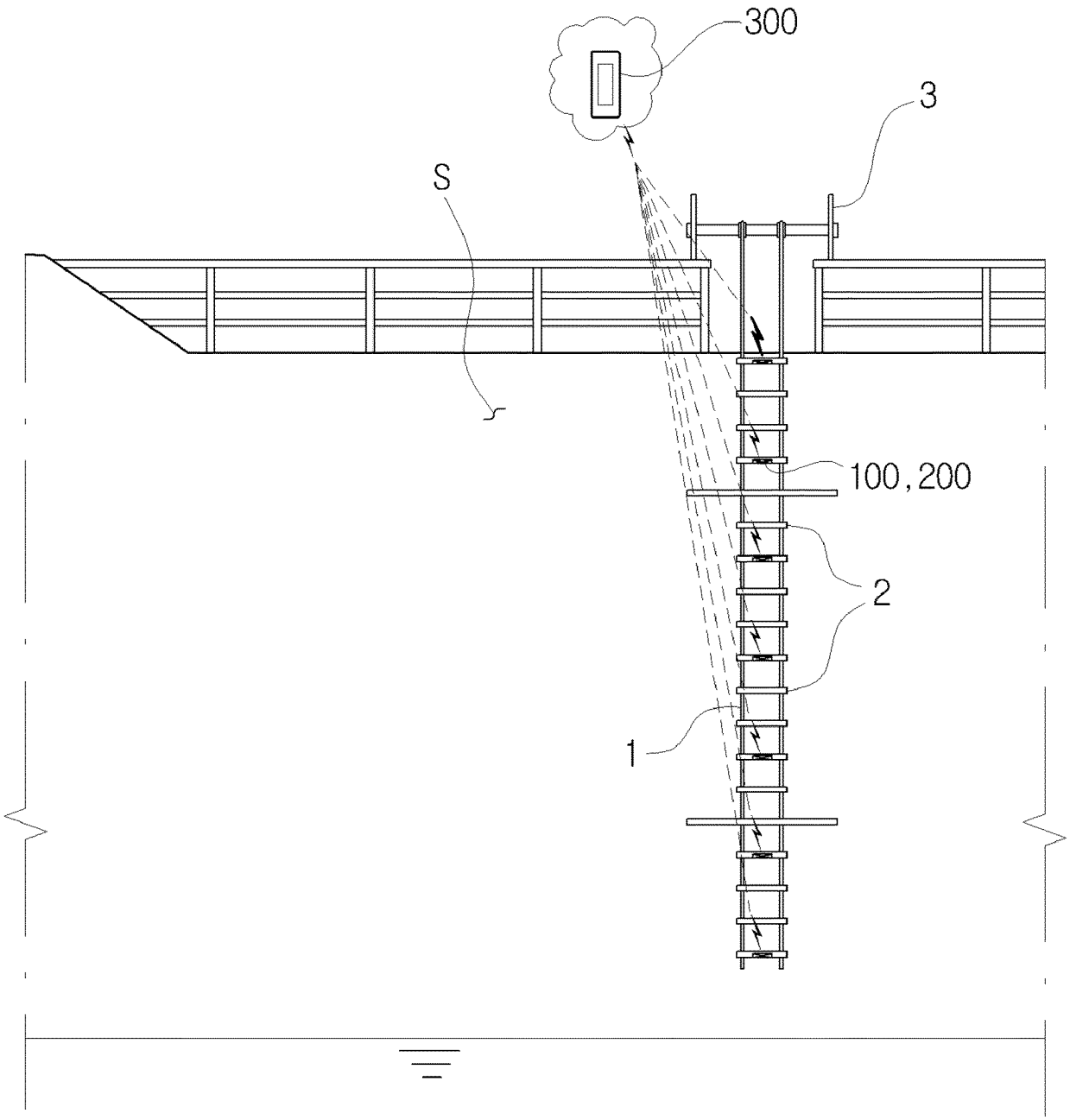


FIG. 2

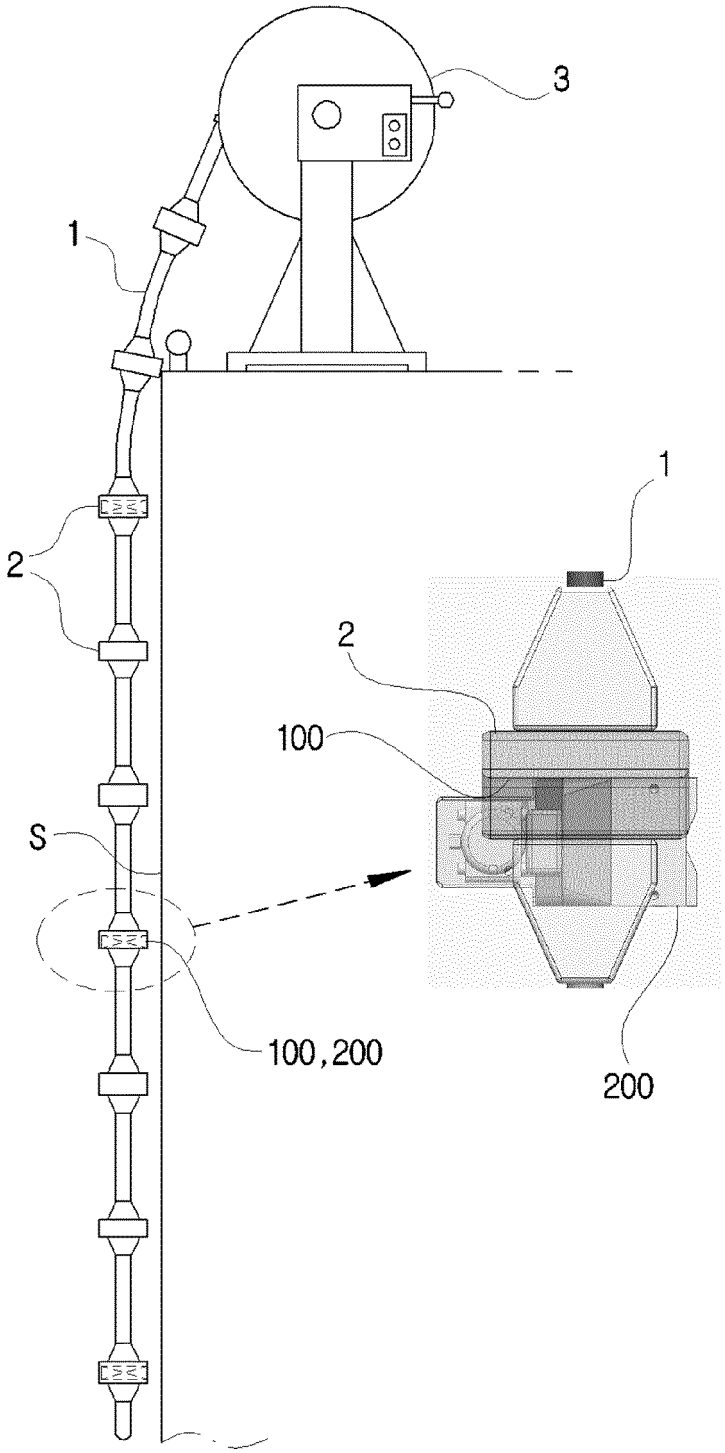


FIG. 3

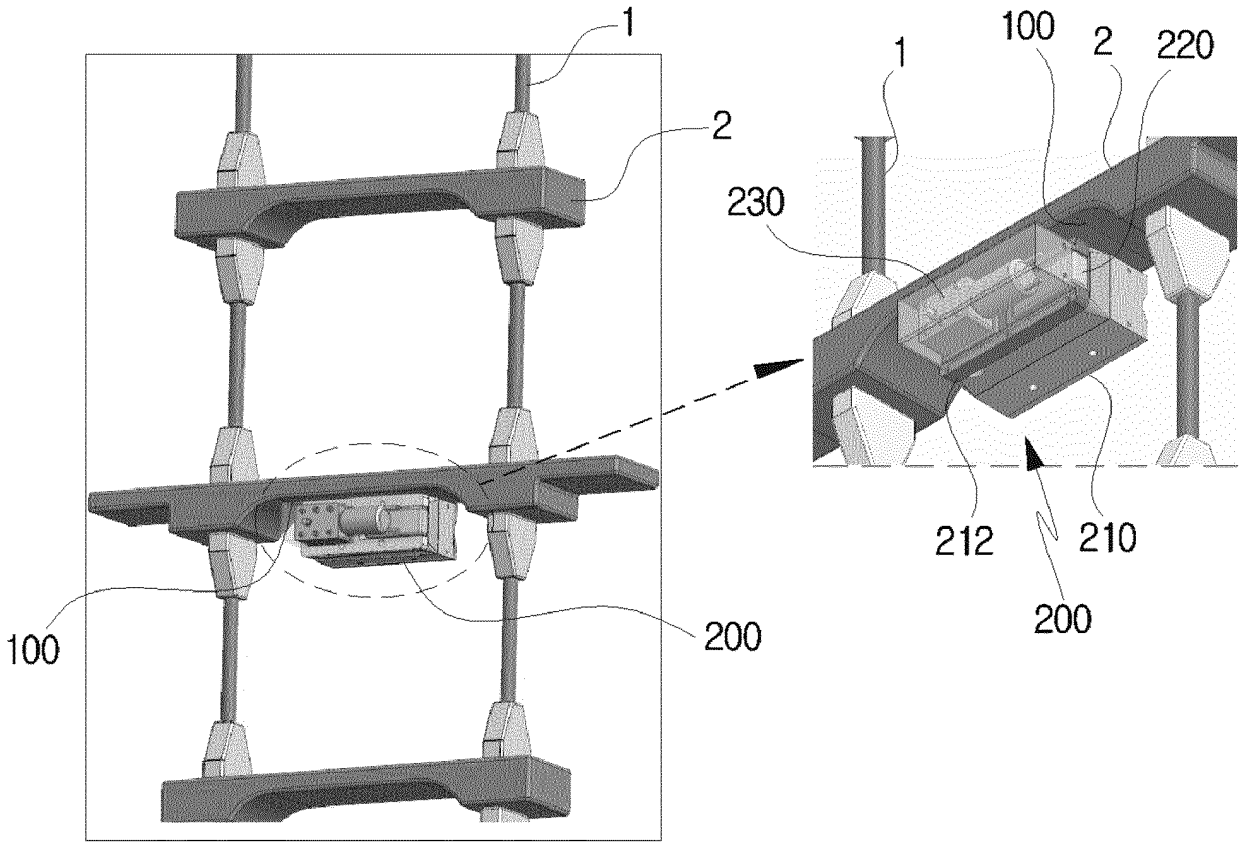


FIG. 4

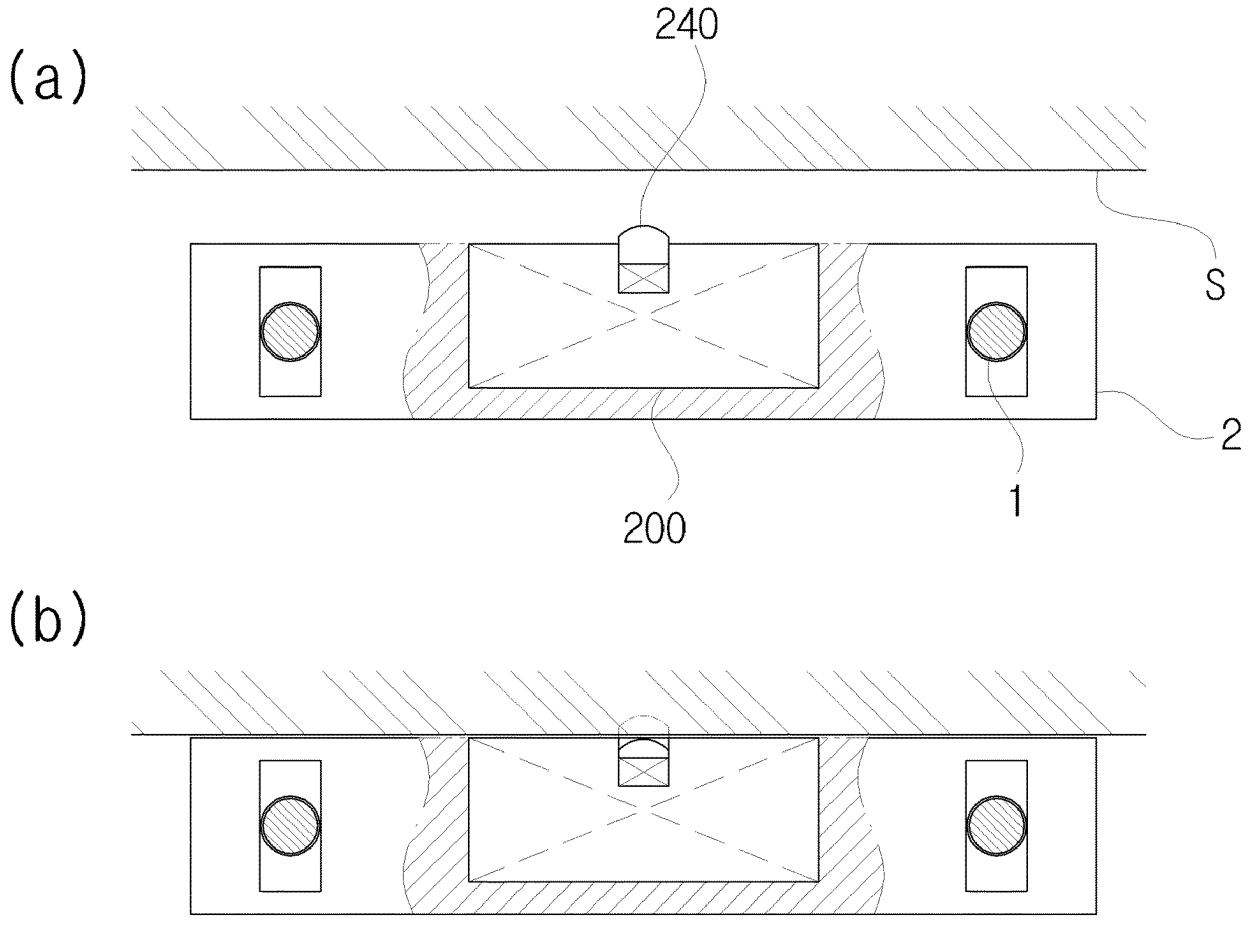


FIG. 5

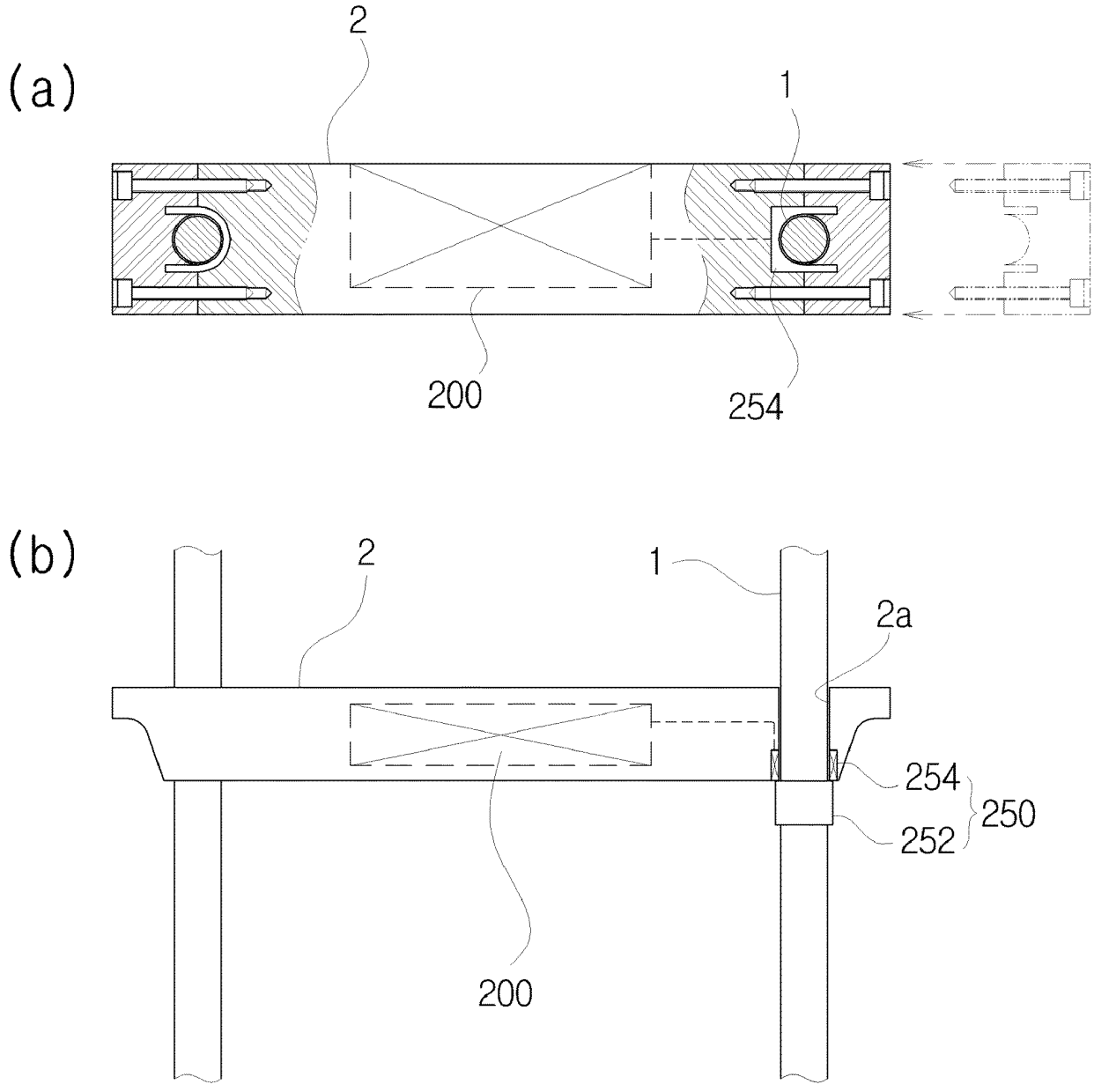
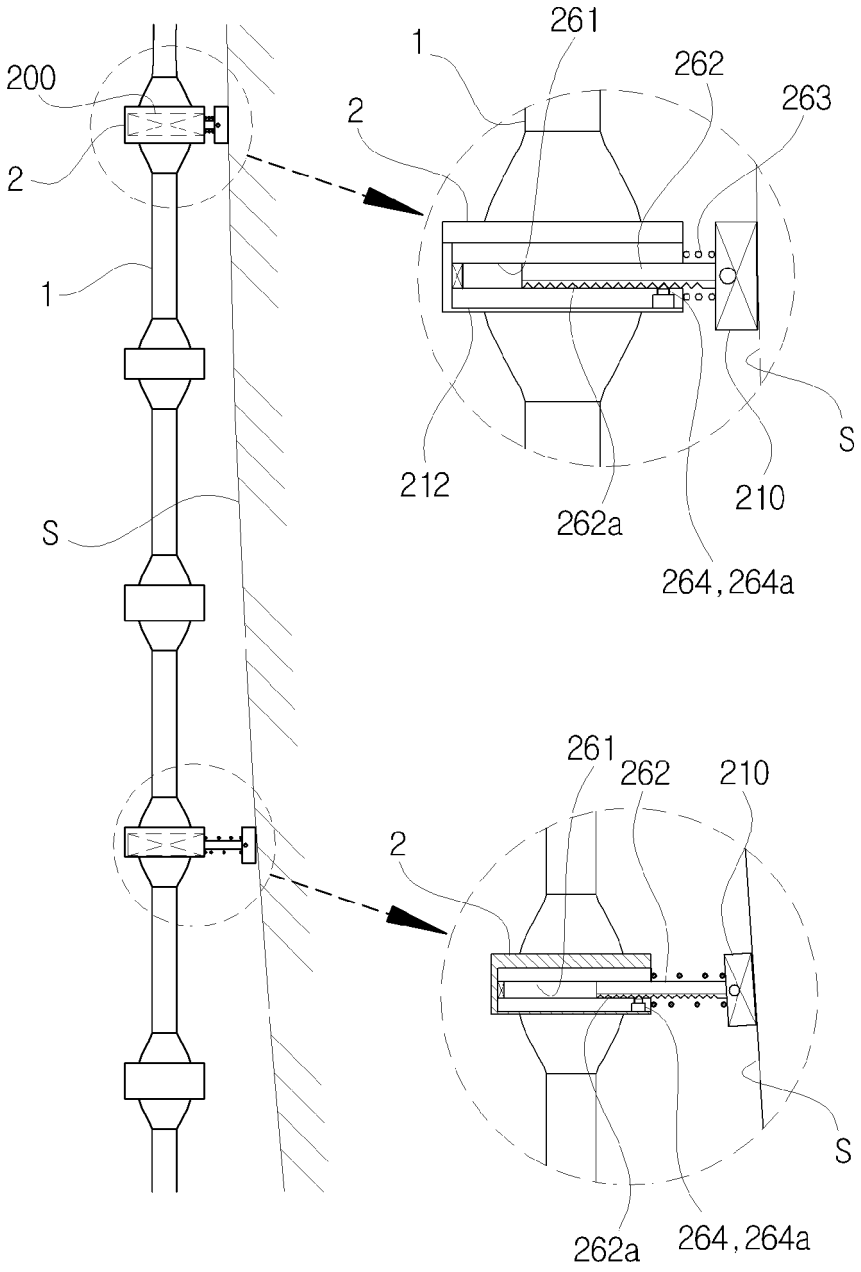


FIG. 6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INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2021/019857

A. CLASSIFICATION OF SUBJECT MATTER

E06C 7/18(2006.01)i; **B63B 27/14**(2006.01)i; **E06C 9/14**(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)

E06C 7/18(2006.01); A62B 1/16(2006.01); A62B 35/00(2006.01); B63B 27/14(2006.01); E06C 5/26(2006.01); E06C 9/14(2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models: IPC as above
Japanese utility models and applications for utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & keywords: 사다리(ladder), 자석(magnet), 통신모듈(communication module), 배터리(battery), 모터(motor), 접지센서(grounding sensor)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
DY	KR 10-2014-0018617 A (KOREA INSTITUTE OF MARITIME AND FISHERIES TECHNOLOGY) 13 February 2014 (2014-02-13) See paragraphs [0020]-[0027] and figures 1-3.	1
DA		2-4
Y	KR 10-1772109 B1 (GS TECH CO., LTD.) 31 August 2017 (2017-08-31) See paragraphs [0030] and [0045] and figures 1-3.	1
A	KR 10-1434480 B1 (SAMSUNG HEAVY IND. CO., LTD.) 26 August 2014 (2014-08-26) See paragraphs [0043] and [0095] and figures 3-5.	1-4
A	KR 10-1474983 B1 (SAMSUNG HEAVY IND. CO., LTD.) 19 December 2014 (2014-12-19) See paragraph [0076] and figures 7-8.	1-4

☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"D" document cited by the applicant in the international application
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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
31 March 2022	**31 March 2022**
Name and mailing address of the ISA/KR **Korean Intellectual Property Office** **Government Complex-Daejeon Building 4, 189 Cheongsa-ro, Seo-gu, Daejeon 35208** Facsimile No. **+82-42-481-8578**	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 2019)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2021/019857

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2000-084100 A (ISHIKAWAJIMA HARIMA HEAVY IND. CO., LTD.) 28 March 2000 (2000-03-28) See claim 1 and figures 1-2.	1-4
PX	KR 10-2305543 B1 (KOREA OCEAN TECH CO., LTD.) 27 September 2021 (2021-09-27) See claim 1 and figures 1-4. * This document is a published earlier application that serves as a basis for claiming priority of the present international application.	1-4
PX	KR 10-2322896 B1 (KOREA OCEAN TECH CO., LTD.) 10 November 2021 (2021-11-10) See claims 1-2 and figures 1-5. * This document is a published earlier application that serves as a basis for claiming priority of the present international application.	1-4

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
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REFERENCES CITED IN THE DESCRIPTION

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