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JAPANESE UTILITY MODEL REGISTRATION APPLICATION

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Attn: Director General of the Patent Office

1. Title of the Idea
MOUNTING DEVICE OF UNDERWATER SEARCH ECHO SOUNDER TRANSDUCER TO NONMETAL VESSEL HULL

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4. List of Attached Documents
(1) Specification 1
(2) Figures 1
(3) Copy of Application 1

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Japanese Unexamined Utility Model Registration No. 54-54365

Specification

1. Title of the Idea

MOUNTING DEVICE OF ECHO SOUNDER TRANSDUCER FOR HYDROSPACE SENSOR TO NON-METALLIC SHIP

2. Scope of Registered Utility Model

A mounting device of an echo sounder transducer for a hydrospace sensor to a non-metallic ship configured with an echo sounder transducer case that is held so that a radiation surface of the ultrasonic transducer appears on the lower end surface with a flange in the periphery of the upper end surface, a frame in the form of rectangular parallelepiped shape having a hitch part that is embedded in advance in the bottom of the ship and formed so as to be held after at least two mutually opposing flanges of the echo sounder transducer case are slid and engaged, and a latch provided on the remaining side of the frame to latch the flanges.

3. Detailed Description of the Idea

The present idea relates to an echo sounder transducer mounting device to mount in the bottom of a ship in which an echo sounder transducer for the hydrospace sensor is projected a specified length below the bottom of the ship, and particularly relates to an echo sounder transducer mounting device in which an echo sounder transducer can be mounted extremely easily on the bottom of a non-metallic ship.

A hydrospace sensor that detects a school of fish, the bottom of the ocean, or the like to observe an underwater condition sends an ultrasonic pulse signal of a specified frequency at a constant cycle from an echo sounder transducer mounted on the undersurface of the bottom of a ship, receives a reflected wave from a school of fish or the like, and displays the received signals on a recorder to provide precise hydrospace information to a user. Because the reflected signals that come back to the echo sounder

receiver are extremely weak by being faded considerably due to undersea factors, and when these are amplified in a high degree, various noises are also amplified likewise, so a clear display image is difficult to obtain. Accordingly, it is desirable to minimize to the utmost the fading of the ultrasonic reflected signal that occurs until reaching the echo sounder receiver.

Originally, the ultrasound signal has a characteristic to fade considerably due to an air bubbling layer or an eddy layer, and particularly an air bubbling layer generated when waves crash against the bow as the ship travels the water, and an eddy or the like due to a projection structure of the bottom of the ship covering the surface of the echo sounder transducer, the reception performance of the hydrospace sensor is considerably deteriorated. In order to avoid the air bubbling layer that rushes through the bottom of the ship, conventionally the echo sounder transducer have been held by projecting anywhere from 20 to 40 [cm] from the bottom surface of the ship. More specifically, The upper surface of an steel made echo sounder transducer case has been cut in conformity to an inclination of the bottom of the ship part and the cut surface was weld to the board of the bottom of the ship. This method has been a suitable installation method for a steel ship that was the mainstream in the past; however, this could not be applied to a FRP (fiberglass reinforced plastics) ship that has been popularized rapidly in recent years.

This idea is to provide a suitable echo sounder transducer mounting device to install the echo sounder transducer into FRP ships.

Descriptions of embodiments of the present idea will be given hereinafter with reference to drawings.

FIG. 1 is a conventional device in which an echo sounder transducer is mounted in the bottom of the ship of a steel ship.

In FIG. 1, ultrasonic transducers 3 and 4 are mounted on a plate 2 that configures an echo sounder transducer case 1, and the plate 2 is fixed by a bolt 5. The upper surface of the echo sounder transducer case 1 is welded and fixed continuously on the bottom sheathing 6.

On the other hand, in the case of an FRP ship in which the body is formed by a laminating material of FRP resin, a welding method cannot be used so a fastening method that uses a bolt or the like is considered.

FIG. 2 is a conventional device where an echo sounder transducer is mounted to a wooden ship. This was widely performed in the previous stage transitioning to the steel ship.

In FIG. 2, flange 7 where an appropriate number of mounting holes are provided in the periphery is welded on the upper surface of an iron echo sounder transducer case 1, and the echo sounder transducer case 1 is fixed to the top and bottom of the bottom sheathing 8 by using a bolt 12 and a nut 13 that penetrate filler pieces 10 and 11 to compensate the inclination of the bottom part of the ship.

Although the same mounting method as the mounting method to the wood ship in FIG. 2 may be considered for use, a partial deterioration of strength is likely to occur because the mounting holes are drilled into the bottom sheathing, and this leads to deficiency requiring a preventive treatment for water leakage.

FIG. 3 illustrates an embodiment of the present idea. FIG. 4 illustrates an explanatory drawing for a mounting process of the embodiment. FIG. 5 illustrates the essential part of the embodiment. FIG. 6 is a cross-sectional view of the embodiment described above. FIG. 7 and FIG. 8 are cross-sectional views of another embodiment.

In FIG. 3, ultrasonic transducers 3 and 4 are held on the bottom surface of the echo sounder transducer case 15 so that those radiation surfaces appear from the case, and a flange 16 is provided integrally on the upper surface of the echo sounder transducer case.

A U-shaped or L-shaped hitch part 17 is provided on three sides as illustrated in FIG. 5 and a frame shape having notch 18 is formed on the remaining side in the bottom of an RFP ship. Frame 19 is embedded in advance when forming the ship body with FRP resin. The hitch part 17 may be integrally formed with the frame 19, or may be configured by welding a U-shaped or I-shaped metal fitting to the frame, and when embedding in the bottom of the ship in advance, the hitch part 17 is outside the bottom of the ship. Screw hole 20 is cut in the notch part 18 of the frame.

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