

1

2,776,941

HOLDER FOR UNDERWATER ANODE

Ernest A. Wagner, Cleveland, Ohio, assignor to Union Carbide and Carbon Corporation, a corporation of New York

Application February 25, 1954, Serial No. 412,555

2 Claims. (Cl. 204—196)

This invention relates to the mounting of underwater anodes upon the metal hull of a ship and has for an object to provide a simple and inexpensive device of this sort which offers less resistance to movement of the ship than have prior devices, and which is adapted to have the supply conductor for the anodes carried either through the hull or along the outside of the hull. Another object is to enable such a supply conductor to enter an anode holder in alignment therewith, provide a point of connection with the anode lead, and pass between the anode holder and an outer surface of the hull, and out the opposite end of the holder from that at which the conductor entered the holder.

This invention is an improvement upon that in the prior invention and application of J. P. Oliver, Serial No. 400,243, filed December 24, 1953 for Mounting for Underwater Anode for Ship's Hull.

Referring to the drawings Fig. 1 shows a preferred embodiment of this invention as viewed from the outer side of the ship and through the water. Fig. 2 is a section one the line 2—2 of Fig. 1. Fig. 3 is a section on the line 3—3 of Fig. 2. Fig. 4 exemplifies another embodiment of this invention in which the supply conductor passes through the outer plate of the hull.

As shown in Fig. 1 a pair of anodes 10 and 11 are longitudinally spaced a substantial distance, depending on the length of the ship, as described in the aforementioned application of J. P. Oliver.

Secured to the outer plates 12 of the ship are the anode holders 13. A supply conductor 14 for the anodes enters the holder 13 as shown in Fig. 2 through the conduit 15, passes beneath the bottom of the anode holder and out the opposite end of the holder in substantial alignment therewith. A branch conductor 16 leads from the conductor 14 to some appropriate type of connection with the anode 10. Having the bottom 17 of the anode holder spaced from the outside of the hull enables the conductor 14 to be passed between the bottom 17 and outside of the hull 12. As shown in the drawing this conductor 14 is insulation covered and the ends of the anode holder containing the conductors 14 and 16 may be filled with some appropriate plastic insulating material shown only on the left side in Fig. 2. This insulating material may extend beneath the bottom 17 and into and through the conduits 15. In any case the juncture 23 between conductors 14 and 16 must be sealed with an insulating material.

Next to the carbonaceous anode 10 is a sheet 18 of polytetrafluoroethylene known as "Teflon." This Teflon has been found inert to chlorine and any other deposition products of electrolysis of sea water. Such Teflon sheet may extend above the top of the anode holder if desired on one or more sides to lengthen the path of current flow from the anode to the ship's hull and thus tend to make the current density more nearly uniform than it might otherwise be. A layer of resilient rubber 19 is placed outside the Teflon 18 and between it and the sides of the anode holder 13 for the purpose of taking up any shock or jar which might otherwise tend to fracture the anode.

2

Projecting outward from the bottom 17 of the holder 13 are a pair of studs 20 threaded as illustrated and welded in place for the purpose of retaining the plugs 21 for holding the anode 10 within its holder. These plugs are also preferably of an inert insulating material such as the Teflon which may be threaded on to the studs 20. The top surface of the plugs may be provided with a slot 22 for a screwdriver to aid in loosening the plugs. As shown in the drawing of Figs. 2 and 3 the upper portion of the plug is bevelled at 23 to tightly fit within a corresponding bevel in the anode so that when the plug is tightly screwed in place the tight fit between the plug head and the bevelled recess in the anode is sufficient to keep out sea water. To guard against the plugs being accidentally loosened a pin 24 of cement, Teflon, or other inert insulating material or graphite is located to prevent rotation of the bushing on the studs while the pin is in place.

The longitudinal ends of the holder 13 are inclined at 25 to lessen the resistance offered by the anode holder to the motion of the ship. While the bottom 17 of the anode holder is spaced from the outer surface of the hull nevertheless the sides and ends of the holder 13 are welded to the hull as shown by the welds 26 which extend continuously around the base of the holder in a manner to keep water out from the space between the outer surface of the hull and the bottom 17 of the holder. In each embodiment at least one end of each holder is provided with a removable cover 27 located in the inclined end portion 25. Upon removal of this cover 27 access is obtained to conductors 14 and 16 for purposes of mechanically clamping or soldering them after the anode 10, with attached conductor 16, has been installed in the holder 13. To reduce the danger of the connection between the main and branch conductors 14 and 16 becoming loosened, such connection is preferably soldered at 28.

The same design of anode holder as shown in Figures 1, 2, and 3 can be adapted to anode installations which have the current supply conductor 29 passing directly through the hull of the ship. This is shown in Figure 4. The openings provided for conduit 15 (Fig. 2) at each end of the casting are closed by welding in plugs 15a. Passage of the cable through the hull can be sealed by conventional means such as collet-type seal or standard stuffing box. The space around the conductor within the ends of the anode holder can be filled with an appropriate plastic insulating material, not shown.

Among the advantages of this invention may be emphasized the spacing of the bottom 17 of the anode holder from the hull plate 12 for the purpose of allowing an insulated conductor 14 to pass between them, while the sides and ends of this holder 13 are sealed in place to preclude the entry of sea water. The anode holder of this invention may be of standard size for use on a ship of any size and length.

The mounting studs 20 are already accurately located and welded in place in the factory to the holder bottom 17. The mounting holes in the anode are located and drilled in the factory so as to insure alignment with the centers of the mounting studs. Providing the anode holder with a bottom on which to attach the mounting studs 20 makes it unnecessary to drill and tap holes in the hull to mount the studs and thereby the possibility of causing a leak in the hull is precluded. In addition to providing a passage for the supply conductor, the spacing of the anode holder bottom 17 from the hull plate 12 makes it possible to maintain close contact between the base of the holder and the hull surface around the entire periphery of the base where it is welded to the hull at 26 (Fig. 2) even when the hull surface is curved especially in a vertical transverse plane or when it is necessary to mount the holder over hull areas where rivet heads protrude. The conductor cable 16 is attached to the anode

3

by conventional means at the factory. Due to the relatively fragile nature of the graphite anode and this cable connection the anode with cable attached is shipped in a package which protects against breakage. Similar precautions are not necessary for the anode holder. After the holder has been welded to the ship the insulating elements 18 and 19 are put in place and the anode with the lead wire is inserted in the holder. It is then only necessary to tighten the plugs on the studs and insert the locking pins 24 to secure the anode in place.

I claim:

1. An underwater anode mounting on a metallic ship's hull comprising a metal holder having a pair of side walls, a pair of end walls, and a bottom wall united in the form of an anode receptacle, a carbon anode insulatingly resiliently disposed in said receptacle, an extension leg at the bottom end of each of said side walls, an inclined leg at the upper end of each of said end walls, said extension

4

legs and inclined legs being fixedly attached to said hull and defining an enclosed clearance space between said receptacle bottom and said hull, a stud secured to the bottom of said receptacle and insulatingly retaining said anode therein, and perforated access means communicating with said clearance space and said carbon anode for the introduction of a supply conductor lead, said mounting being adapted to receive therethrough said lead and to accommodate a portion of said lead in the clearance space between said receptacle bottom and said hull.

2. An underwater anode mounting according to claim 1, at least one of said inclined legs having a removable cover.

References Cited in the file of this patent

UNITED STATES PATENTS

510,900 Cutten Dec. 19, 1893