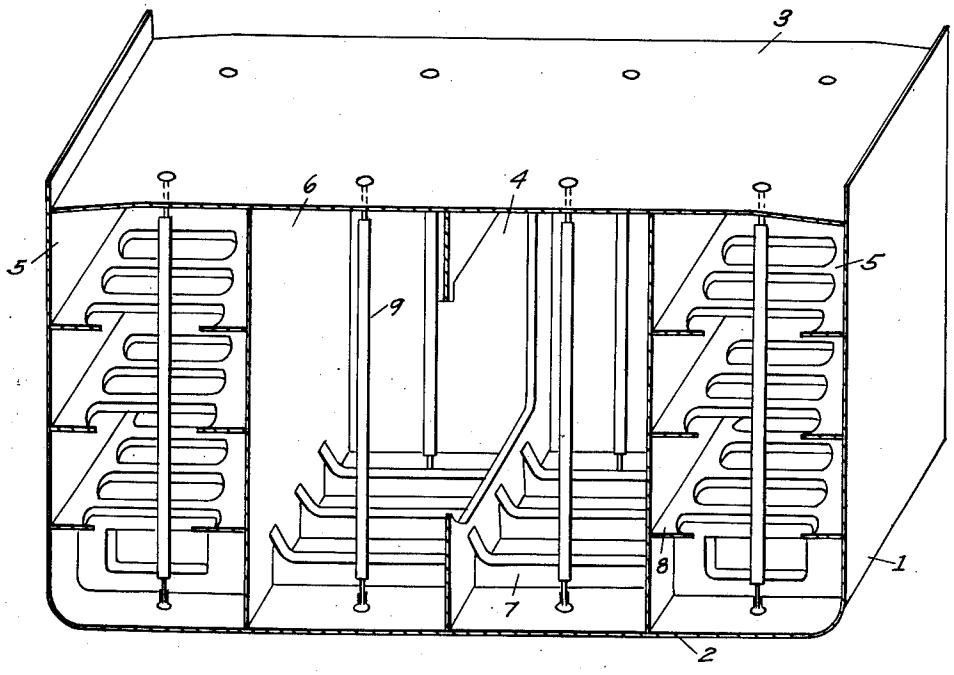
Nov. 27, 1962 D. SPECTOR 3,066,090

ANODE MOUNTINGS

Filed July 21, 1959

FIG. 1



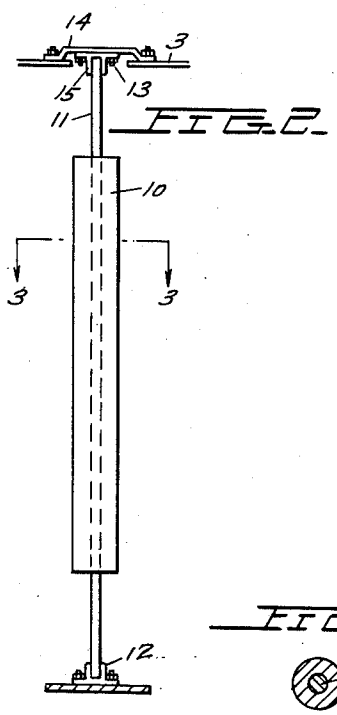




FIG. 2

FIG. 4

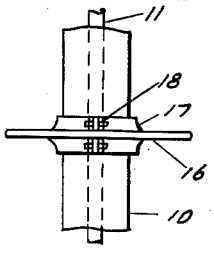



FIG. 5

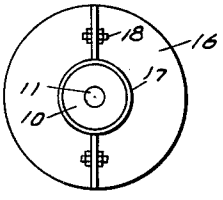
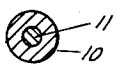



FIG. 3




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# ANODE MOUNTINGS

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4 Claims. (Cl. 204—197)

This invention relates to the cathodic protection of the walls and interior metal parts, such as bulkheads, braces or the like, of oil tankers, more particularly to galvanic cathodic protection without an impressed external voltage.

When a tanker is not under cargo, it is usually ballasted with sea water with which its oil tanks are filled. The sea water has a strong corrosive action on the metal parts with which it comes into contact, which is as a rule counteracted by cathodic protection. In conventional cathodic protection arrangements a large number of anodes of magnesium or magnesium alloy is disposed throughout the interior of the tanks. They are fastened to the walls, braces and other structural elements in electrically conducting relation; the anodes and the structural metal parts of the tanks, which form together the cathode, thus constitute a corresponding number of galvanic cells whose polarity acts against the corrosion.

The arrangement of a large number of anodes has many drawbacks, one of which is the difficult and inconvenient work required for the replacement of the anodes. The invention, therefore, has the object to provide an arrangement of the readily removable anodes which make it easier to mount and dismount them.

The invention consists in an arrangement of the anodes for the galvanic cathodic protection of tanks in tankers, wherein the anodes are rods extending over the full height of the tanks or compartments to be protected; the deck or other roof of the tanks or compartments has openings allowing the introduction and withdrawal of the anodes into and from the tanks or compartments; removable lids are provided for said openings; and holding members are disposed on the bottom of the tank or compartments and, in vertical register therewith, on said lids, for the detachable mounting of the anodes in operative position.

In this arrangement, therefore, the anodes are disposed in a substantially vertical position.

The anodes may consist of any suitable material such as magnesium, magnesium alloy, zinc, aluminum, or indeed any other metal which, in the electromotive series, is more electronegative than the structural metal of the tanks. In a preferred embodiment of the invention the anode metal is cast on a carrier core of a more positive metal such as steel or the like, whose ends project on either side from the anode metal and serve as fastening members.

The anode can be handled by means of any suitable handling equipment, or even by hands, in order to be lowered into the tanks through the apertures in the deck or roof, while the operation of securing its bottom end to the holding member provided at the bottom of the tank is performed by an operator entering the tank. No other work is required in the interior of the tanks, especially no work involving scaffolding, as virtually the entire handling is done on the deck.

According to a further feature of the invention, boosting anodes are mounted on some or all of the anodes in the form of discs or flat collars which may be designed as flat split rings adapted to embrace the anodes.

The invention is illustrated, by way of example only, in the accompanying drawings in which:

FIGURE 1 is a diagrammatic perspective view of a section of a tanker showing the interior of a central tank and two wing tanks provided with anodes in accordance with the invention;

FIGURE 2 is an elevation of a single anode according to the invention;



FIGURE 3 is a cross section on line III—III of FIGURE 2;

FIGURE 4 is a fragmentary elevation of an anode according to the invention provided with a disc-shaped boosting anode;

FIGURE 5 is a plan view corresponding to FIGURE 4.

FIGURE 1 shows part of a tanker including a hull **1** with bottom wall **2**, deck **3**, central tank **4** and two wing tanks **5** divided from the central tank by bulkheads **6**. Within the tanks, conventional ribs **7** and other stiffening members **8** are provided.

In accordance with the invention, upright anodes **9** are disposed at selected places throughout the tanks. The number and placement of the anodes will be calculated according to the requirements of each particular case.

Each anode comprises a layer of anode metal **10** cast on a relatively inert core **11**. The anode metal is electronegative in relation to the structural metal of the tanks. The core is an electric conductor which at the same time has good mechanical strength properties so as to be able to carry the anode, e.g. steel. The anode may have any desired suitable profile; it has been shown to be cylindrical but it may have any other appropriate form.

Disposed on the bottom **2** are sockets **12** for the reception of the foot ends of the anode cores **11**. In register therewith, apertures **13** are provided in the deck which are so wide that the anodes can be lowered or raised through them without jamming. These apertures are normally sealed by lids **14** screwed or otherwise detachably secured to the deck and having on the underside sockets **15** for the reception of the top ends of the cores.

This manner of detachably securing the anode cores to the bottom of the tanks and the deck has been shown by way of example only and may be modified. For example, socket members or mortises may be provided in the ends of the cores, and corresponding tenons or pins at the bottom **2** and the lids **14**.

In some cases the arrangement of boosting anodes will be desirable. These, as known per se, are anodes of large surface, e.g. discs, designed to generate a stronger galvanic current at the beginning in order more rapidly to polarise the protection system. In general these boosting anodes are disposed separately from the protecting anodes proper.

In accordance with the invention the boosting anodes are discs mounted on the main anodes. For example, they may be flat split rings **18** made integral with semicircular collars **17** apt to embrace the anode **10**, and with flanges **18** by means of which the two halves of each ring are assembled. The boosting anodes are preferably made from magnesium or a magnesium alloy.

In the foregoing, I have described my invention only in connection with preferred embodiments thereof. Many variations and modifications of the principles of my invention within the scope of the description herein are obvious. Accordingly, I prefer to be bound not by the specific disclosure herein but only by the appending claims.

I claim:

1. The combination of a ship's hull having a deck forming the top wall of a tank, said tank having a bottom wall, and a protective arrangement comprising a plurality of anodic elements in predeterminedly spaced array within said tank and extending substantially from said deck to said bottom wall, each of said elements comprising a carrier core of relatively inert material, each core carrying-anodic material, a socket for each core on said bottom wall, an end of said core being in the respective socket, a respective aperture in the deck for each of said elements and of sufficient size such that each respective element can be lowered therethrough into said tank, lid means for sealingly closing said apertures, and means for securing said lid means to said deck, said lid means having sockets for

respective cores and the other ends of said cores being therein, whereby said elements are securely supported between said deck and said bottom wall.

2. In a combination as set forth in claim 1, at least one of said elements haivng a disc of anodic material to encompass said element and means for securing said disc in gripping relationship on said element.

3. The combination as set forth in claim 1, wherein each core has a free sliding fit in the respective socket at each end.

4. In a combination as set forth in claim 1, said hull comprising a plurality of spaced horizontally disposed stiffening members, having apertures, said elements passing through said apertures and being spaced from the edges thereof.



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