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ANODE FOR CATHODIC PROTECTING SYSTEMS

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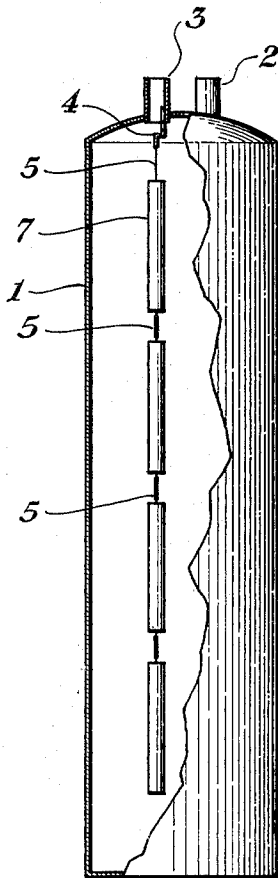


Fig. 1

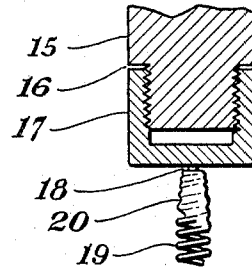


Fig. 4

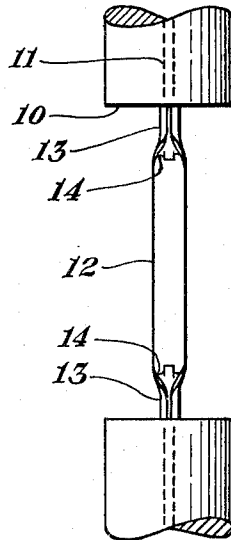


Fig. 3

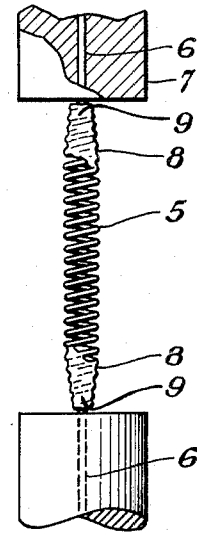


Fig. 2

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ANODE FOR CATHODIC PROTECTING
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3 Claims. (Cl. 204—197)

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The invention relates to the electrolytic protection of metallic surfaces against corrosion, and more particularly relates to an improved electrode construction for use in an electrolytic system adapted to protect metal surfaces in containers, such as water heaters, condensers, heat exchangers and the like.

It is now an established practice in the art to which the invention relates to protect the common structural metals such as iron, steel, galvanized iron, and the like by the use of a metallic anode having a solution potential greater than that of the metal to be protected. It has been found that, in the main, corrosion of these containers is electrolytic in nature and is associated with the flow of electric currents between various parts of the metal surfaces. By the proper utilization of a metallic anode having a higher solution potential than the metal to be protected a controlled electric current is provided which renders the structural metal cathodic and thus without tendency to go into solution due to electrolytic action, while producing electrolytic corrosion of the anode with its attendant solution.

For example, in the case of the household hot water heaters, it is now customary to insert a magnesium rod into the tank to be protected in such a manner that the magnesium anode contacts the fluid in the tank and at the same time is in electrical contact with the structural metal of the tank. This electric cell formed operates by the magnesium anode slowly going into solution in the electrolyte while the tank acting as the cathode is protected to the extent that it exhibits no tendency to corrode or go into solution due to the action of the water.

In those instances where the magnesium anode is included in the assembly prior to installation no difficulties are encountered since a continuous rod of magnesium can be inserted readily and properly connected to one of the usual nipples provided for the water connections. However in those instances where a tank, such as a hot water heater, has already been installed or renewal of the anode is indicated it oftentimes happens that the clearances are such that a continuous section anode can not be inserted or otherwise installed in the tank. To overcome this difficulty it has been proposed to make the anode in short sections or segments with a soft iron wire core acting to hold the sections together as a continuous or single anode. In practice it has been observed that the anode sections often become separated from each other due to

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breakage of the iron wire core between the sections as the anodes assembly is flexed in packaging and during the assembly operation. This difficulty is also frequently encountered when a braided or woven iron or copper core is substituted for the usual iron wire core.

The present invention resides in the discovery that by using a spring connector between the anode sections, and preferably a coil spring connector, this difficulty is entirely eliminated and the electrode assembly can be doubled up into a compact unit for shipping and yet be readily inserted into a tank where minimum clearances obtain without the attendant danger of the electrode sections becoming separated from each other.

It is therefore the principal object of the invention to provide a sectionalized electrode structure wherein the various sections are connected together by a spring.

Another object of the invention is to provide a sectionalized magnesium anode structure having a metal core wherein the various sections are in electrical connection by means of a spring.

A further object of the invention is to provide a magnesium anode assembly in which sections of magnesium are formed over a dissimilar metal core and connected together by means of a coil spring.

Other further objects and advantages will be apparent during the course of the following description which taken in conjunction with the annexed drawing illustrates a way of putting the invention into effect, such disclosure illustrating but one of various ways in which the principle of the invention may be used.

In the drawing:

Fig. 1 is a side elevation partly in section illustrating the new electrode structure installed in a conventional hot water tank.

Fig. 2 is a sectional view in enlarged detail showing two sections of the anode connected together in the preferred manner of the invention.

Fig. 3 is an enlarged sectional view of two anode sections connected together by a spring member.

Fig. 4 is an enlarged sectional view showing another embodiment of the invention.

Referring to Fig. 1, hot water tank 1 is provided at the top with the usual threaded holes into which nipples 2 and 3 are screwed. Nipple 3 forms a portion of the anode assembly in that a wire or bar 4 is soldered or otherwise electrically connected to the nipple. The wire 4 is at-

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tached to one end of a spring member 5 while the other end of spring 5 is soldered or otherwise electrically connected to the wire core 6 (see Fig. 2) extending through the anode segment or section 7. Each additional section or segment of the anode assembly is similarly connected to a spring 5 in a like manner.

In the enlarged detail of the spring and sectionalized anode shown in Fig. 2 adjacent anode sections 7 with the wire cores 6 are shown connected together by a coaxially disposed coil spring 5 interposed therebetween. Coil spring 5 is preferably tapered at either end at 8 so as to accommodate the core wire or rod 6. The cores 6 are held to the spring 5 as by soldering which may fill the tapered ends thereof, as indicated at 9, whereby the spring provides the sole mechanical and electrical connection between the anode sections.

In the embodiment of the invention shown in Fig. 3 anode sections 10 with cores 11 are connected together by flat bar spring members 12. The bar spring 12 is forged at either end into a sleeve portion 13 to accommodate the metal core members 11. By filling the sleeve 13 with solder 14 or the like a strong connection is obtained.

In the embodiment illustrated in Fig. 4 the metal core has been dispensed with and the end of the magnesium anode segment 15 is undercut at 16 and threaded to engage a metal cap 17 of a dissimilar metal such as brass, bronze, or iron. The metal cap 17 is provided with a centrally disposed and outwardly extending lug 18 which provides a means for connecting to spring 19 as by soldering at 20. It will be apprehended that each end of the intermediate segments of the assembly will be provided with a cap and connected to the adjoining segment. The last or lower segment will of course need no cap on one end. At the upper end of the electrode assembly illustrated by Fig. 4 the lug will be connected to the tank in the manner described in connection with Fig. 1.

It will be readily understood that the wire core and properly spaced springs may be formed from a single piece of wire it being only necessary to cast the magnesium segments over the wire core at the proper location.

In the foregoing manner a sectionalized anode is provided which is permanently flexible so that it may be compactly boxed for shipping and can be flexed readily and easily during installation without danger of failure.

While the invention has been described particularly with reference to anodes for use in connection with hot water heaters it is to be understood that the construction described is applicable for use in containers such as condensers, heat exchangers, and the like where installation limitations require the use of a flexible sectionalized electrode. Additionally it will be apparent that while the invention has been described with particular reference to magnesium anodes because magnesium possesses unusually desirable solution potential properties it is equal-

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ly adaptable for use with aluminum, zinc and similar metal electrodes possessing a higher solution potential than the metal to be protected. The term magnesium as used herein and in the appended claims is intended to include the pure metal as produced commercially as well as the many alloys thereof.

I claim:

1. An anode assembly for the electrolytic protection of a metal container comprising a plurality of anode segments of a metal having a higher solution potential than the container to be protected, coil-spring connectors interposed between and in axial alignment with the segments and providing the sole mechanical and electrical interconnection therebetween, and means at one end of the segmented anode assembly for connecting same to the container.

2. An anode assembly for the electrolytic protection of a metal container comprising a plurality of anode segments of a metal having a higher solution potential than the container to be protected, and each including a core extending axially therethrough of a metal having a lower solution potential than said container, coil-spring connectors interposed between and in axial alignment with the segments, said connectors being mechanically and electrically connected to the segment cores and providing the sole connection between the segments, and means at one end of the segmented anode assembly for connecting same to the container.

3. An anode assembly for the electrolytic protection of a metal container comprising a plurality of anode segments of a metal having a higher solution potential than the container to be protected, and each including end caps affixed to the ends of the segments of a metal having lower solution potential than said container, coil-spring connectors interposed between and in axial alignment with the segments and being mechanically and electrically connected to the adjacent end caps thereof, and providing the sole connection between the segments, and means at one end of the segmented electrode assembly for connecting same to the container.

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