

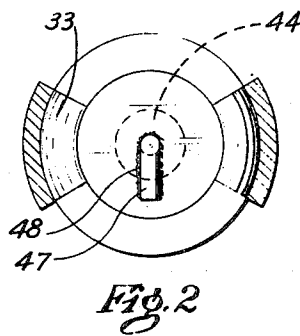
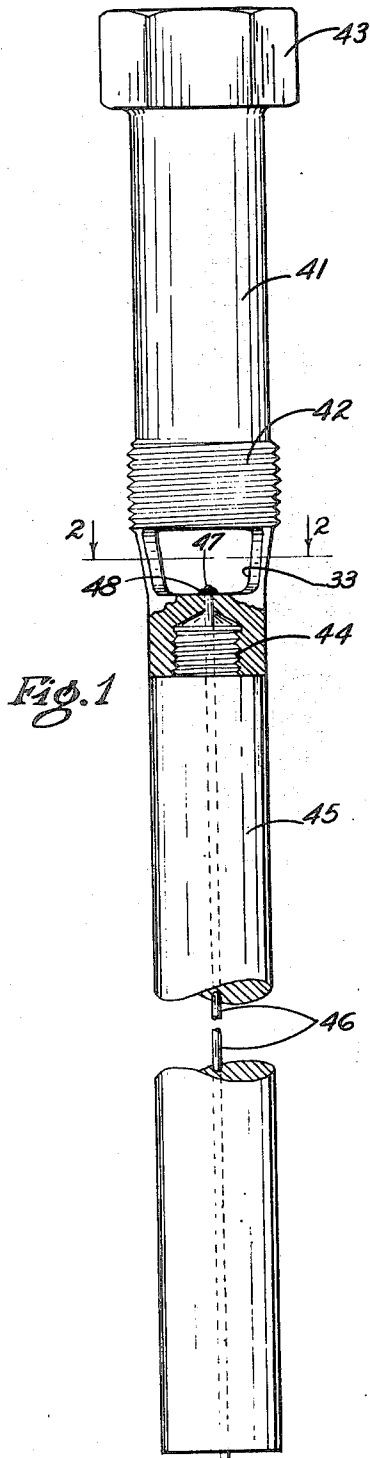
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COMBINATION OUTLET FITTING AND SACRIFICIAL ANODE

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COMBINATION OUTLET FITTING AND
SACRIFICIAL ANODE

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1 Claim. (Cl. 204—197)

1

This application is related to my copending application Serial No. 769,974, filed August 21, 1947, for "Corrosion preventive alloy anode."

This invention relates to avoiding corrosion in fluid-containing vessels and concerns particularly the protection of hot-water storage vessels from excessive corrosion.

A specific object of the invention is to control corrosion of a fluid-containing vessel cathodically.

More specifically, the object of this invention is to provide an assembly for mounting a protective anode in a hot water heater by means of a combination hot water outlet fitting and anode support, whereby a permanently high conductivity electrical connection is established and maintained between the material of the anode and the tank wall.

Another object is to provide protection for the maximum length of time without necessitating disassembly of the tank for replacement of the anodes.

These and further objects will appear during the course of the following specification, and in the drawings forming a part of this specification:

Fig. 1 is a broken elevational view partly in section of a combination hot water outlet fitting, anode support and anode; and

Fig. 2 is a section taken on line 2—2 of Fig. 1.

The electrical potentials and currents involved in the cathodic protection of hot water heaters by sacrificial anodes are small in magnitude, hence a high conductivity connection must be established and maintained for the reason that if resistances of appreciable magnitude are allowed to be present in the circuit they will interfere with the passage of adequate current to afford the required cathodic protection.

I have discovered that sacrificial magnesium alloy anodes such as those made essentially of magnesium with relatively small portions of other elements, merely screwed into a threaded metallic fitting become insulated therefrom, due to seepage of water into the spaces between the threads and the formation therein of corrosion products of high resistivity thus imposing a higher resistance between active anode material and the fitting which in turn is connected to the tank wall. The advantage provided by this invention over the prior methods of mounting sac-

2

rificial anodes is, that a continuously high conductivity electrical connection is established and maintained between the active anode material and the tank wall which it protects, by forming the anode material about a metallic core which is extended into the fitting and is soldered or brazed thereto, the fitting can be screwed into a threaded receptacle in the tank wall.

In Fig. 1 I illustrate an anode mounting arrangement employing a fitting 41 having a thread 42 adapted to be secured in the spud in a hot water tank, and a socket 43 adapted to receive the outlet piping of a hot water distribution system. The outlet fitting 41 has a lateral opening 33 below the threads 42, to provide for flow of water from the tank through the fitting. As illustrated in Fig. 1 the lower end of the fitting 41 may be provided with a threaded socket 44 for receiving a reduced diameter threaded upper end portion of an anode 45 having a core wire 46. Socket 44 is separated from the lateral opening 33 by a wall which has an opening through it to receive the core wire 46. The core wire 46 may be composed of iron, for example, and has an upper end 47 extending through the wall of the fitting 41 and bent over at right angles in contact with the surface of the portion of the fitting below the outlet opening 33. Preferably the core wire 46 is a plated wire in which the coating consists of a suitable metal, such as tin, cadmium, aluminum, silver, titanium, lead, bismuth, or other metal, which will alloy readily with the wire and which, having an atomic diameter close to that of magnesium, will also alloy with magnesium, either by solid solution or by the formation of intermetallic compounds. The use of such a plated core is particularly advantageous in successfully casting the higher aluminum or higher zinc content anodes and obtaining good bonding between the core and the sacrificial anode material. A galvanized iron core rod may also, in certain cases, be employed successfully in forming a magnesium base anode by casting around the core with percentages of zinc or aluminum in the anode as great as or considerably in excess of 10%.

Suitable means are provided for making a permanently high conductivity electric connection between the fitting 41 and the core wire 46. The

3

bent-over portion 47 of the core wire 46 is bonded to the wall of the fitting, by being soldered or brazed thereto as shown by the soldered joint 48. In this manner, even though some parts of the anode 45 should be consumed or disintegrate, and breaks or gaps may be formed in the length of the anode 45, all remaining parts of the anode, being secured to and suspended by the core wire 46, remain in direct electrical contact, through the core wire 46 and the fitting 41, with the metallic walls of the tank to be protected.

Certain embodiments of the invention and certain methods of operation embraced therein have been shown and particularly described for the purpose of explaining the principle of operation of the invention and showing its application, but it will be obvious to those skilled in the art that many modifications and variations are possible, and it is intended, therefore, to cover all such modifications and variations as fall within the scope of the invention which is defined in the appended claim.

What is claimed is:

In an anodically protected hot water heater system of the class wherein a metal hot water tank acts as a cathode and a metal anode is projected into the tank and electrically connected to the tank, the combination of a sacrificial anode of magnesium alloy having a ferrous metal core, a metal water outlet fitting for supporting the anode and core and electrically connecting it with the tank, the fitting having an axial water passage therethrough, connecting means at the outer end of the fitting for connecting it with piping, external threads around the fitting inwardly of the connecting means, for supporting the fitting on the tank and electrically connecting the fitting and the tank, the fitting having a lateral opening inwardly of the external threads, leading from the axial passage through the surface of the fitting, means for mounting the anode on the fitting, said means including a wall integral with the fitting and extending across the fitting

4

below the lateral opening therein and the parts of the assembly inwardly of the external threads of the fitting being no longer in overall diameter than the said threaded portion of the fitting, the wall having an opening therethrough and said core extending through said opening and means bonding the core to the wall in a solid, normally permanent and irremovable electrical connection between the wall and the core, said bonding means being also impervious to liquid, whereby the assembly as a unit may be inserted through an opening in the end of the hot water tank and mechanically and electrically connected thereto, and a permanently high conductivity electrical connection is established between said anode and said fitting; the fitting below the wall and the upper end of the anode having a plug-and-socket, interfitting connection through the middle of which the core extends; the opening through the wall of the fitting being approximately the size of the core; and the bonding means sealing off the opening to prevent water from reaching the interior of the plug-and-socket connection via the opening.

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