

July 15, 1952

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2,603,596

ANODE SUSPENSION AND ELECTRICAL CONNECTION

Original Filed Nov. 17, 1947

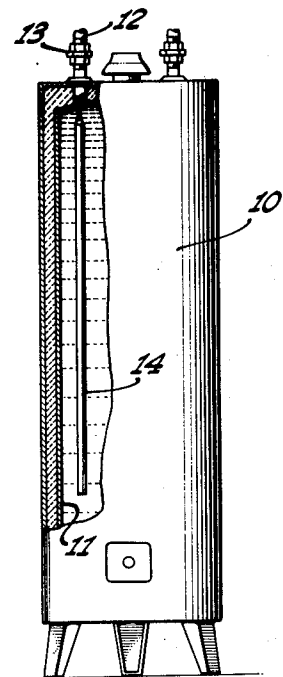


FIG. 1.

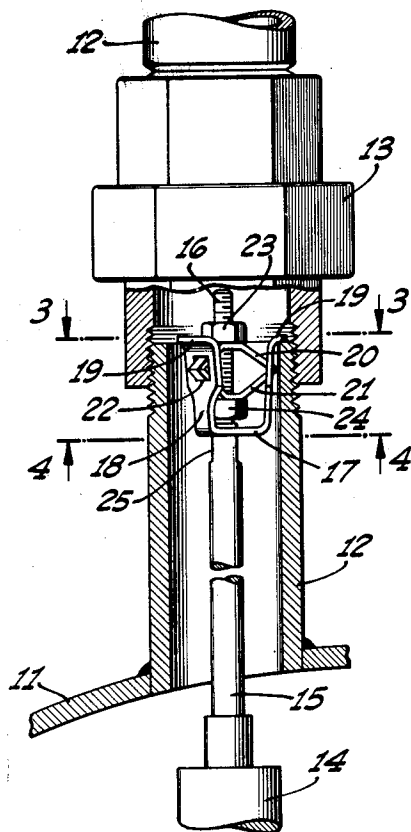


FIG. 2.

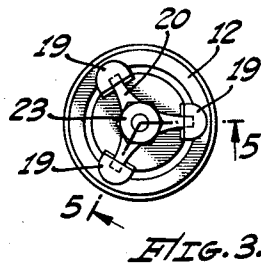


FIG. 3.

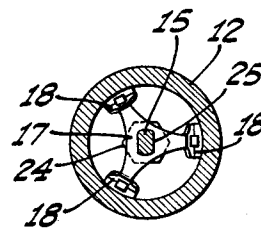


FIG. 4.

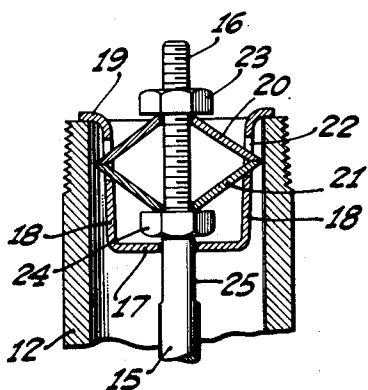


FIG. 5.

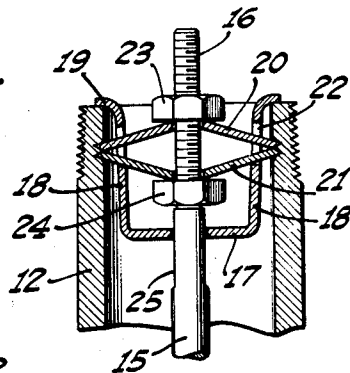


FIG. 6.

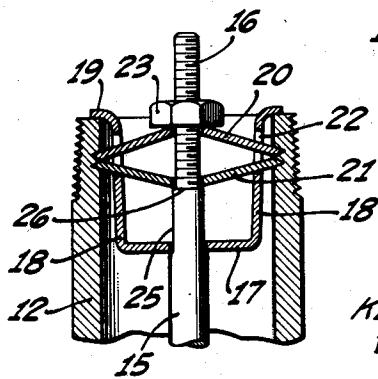


FIG. 7.

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2,603,596

ANODE SUSPENSION AND ELECTRICAL CONNECTION

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Continuation of application Serial No. 786,486,
November 17, 1947. This application May 29,
1950, Serial No. 165,050

2. Claims. (Cl. 204-197)

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This invention relates to a means for suspending or mounting anodes. It has been primarily designed for suspending an anode in a hot water heater and for purposes of clarity the invention will be described in relation thereto although it is susceptible of application in other analogous conditions. This application is a continuation application of my application Serial No. 786,486, filed November 17, 1947 (now abandoned).

In certain localities water conditions are such that corrosion of hot water tanks occurs very rapidly. This rapid rate of corrosion apparently is due to conditions favorable to the setting up of electrolytic action. This can be corrected, or at least modified by positioning within the tank an anode formed of magnesium or a magnesium alloy. The tanks employed for hot water heating are usually formed of steel and frequently are galvanized with zinc. Magnesium being higher on the electro-chemical scale than either iron or zinc may then function as an anode, the water in the tank serving as an electrolyte between the magnesium and the iron or the zinc as the case may be. In installing an anode of this character in a hot water tank it is desirable to suspend the anode from the hot water outlet and it is highly important that a good electrical connection be established between a portion of the anode and the walls of the tank.

An object of the present invention is to provide a means for easily installing or mounting the anode in the hot water outlet from the tank which will provide or establish the desired electrical connection therewith and which is so designed as to facilitate its application and removal from the tank. In the course of time anodes of this character are consumed and the mounting means and the remainder of the anode must consequently be removed and replaced. In other situations it may be desirable to install an anode in an installed hot water tank. The improved mounting means enables not only the removal of a used anode but the application of a new anode either as a replacement or as a new installation.

With the foregoing and other objects in view, which will be made manifest in the following detailed description and specifically pointed out in the appended claims, reference is had to the accompanying drawings for an illustrative embodiment of the invention wherein:

Figure 1 is a view in side elevation of a conventional hot water tank illustrating the anode in applied position therein;

Fig. 2 is a vertical section through the hot water outlet from the tank;

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Fig. 3 is a horizontal section taken substantially upon the line 3-3 upon Fig. 2;

Fig. 4 is a horizontal section taken substantially upon the line 4-4 upon Fig. 2;

Fig. 5 is a vertical section taken substantially upon the line 5-5 upon Fig. 3 and illustrating the parts prior to their having been tightened into position;

Fig. 6 is a view similar to Fig. 5 illustrating the parts after having been tightened into position; and

Fig. 7 is a view similar to Fig. 6 illustrating a slightly modified form of construction.

Referring to the accompanying drawings wherein similar reference characters designate similar parts throughout, 10 indicates a hot water heater the tank of which, indicated at 11, may be formed of steel and which may or may not have been galvanized. In the top of the tank there is usually a hot water outlet 12 that extends upwardly from the top of the tank and which is externally threaded for the application thereto of a union 13. The anode indicated at 14 may be formed of magnesium or like metal that is higher on the electro-chemical scale than either iron or zinc. This anode may have a steel core 15 which is embedded therein or otherwise secured thereto and which extends upwardly from the top of the anode a suitable distance so as to extend through the outlet nipple 12, part 15 providing an anode supporting member or means which can be a part of the anode or a separate part secured to the anode. Part 15 is threaded as indicated at 16. The mounting means embodying the present invention consists of a metallic basket or cradle having a bottom 17 and three upstanding arms 18 arranged to be positioned in close proximity to the walls of the nipple 12 or even rest against the walls. The upper ends of these arms are bent outwardly to provide fingers as indicated at 19 which are engageable with the top of the nipple when the cradle is inserted into the nipple. Within the cradle or basket there are two opposed "stars" or dished members 20 and 21 which have radially extending arms that are preferably sharpened or pointed or have sharp edges at their outer ends to provide penetrating elements for penetrating the interior of the nipple thereby establishing electrical contact with the nipple. The ends of the arms extend through slots or apertures 22 formed in the arms 18 of the basket. Aligned apertures are formed in the bottom 17 of the basket or cradle and through the "stars" or dished members, respectively, to receive the core 15 of the anode. Nuts 23 and 24 are screwed

onto the threaded portion 16 above and below the dished members, respectively. As initially formed the "stars" or dished members are so formed that they will enter the nipple 12 loosely as illustrated in Fig. 5. However, on screwing down the upper nut 23 the dished members will be flattened or straightened somewhat, as illustrated in Fig. 6, having the effect of expanding the dished members so that their pointed outer ends will be driven into the walls of the nipple 12. In this manner a good electrical connection is established between the core 15 through the nuts and dished members to the nipple 12. In the preferred form of construction the core 15 is flatted as indicated at 25 and the aperture formed in the bottom 17 of the basket is shaped to fit this flatted portion so that the core cannot rotate relatively to the basket while tightening the nut 23. In this form of construction the lower nut 24 merely provides an adjustable shoulder on the core against which the dished members may be tightened downwardly on tightening the nut 23. However, as illustrated in Fig. 7, a stationary shoulder 26 may be formed on the core at the base of the threaded portion to seat the lower dished member 21. In this form of construction, when the nut is tightened downwardly the "stars" or dished members are expanded into firm engagement with the walls of the nipple 12 in much the same manner previously described so as to form a good electrical connection therewith. When an anode is thus installed the path of current flow is from the anode 14 to the cathode formed by the tank walls 11 through the nipple 12, the dished members 20 and 21 and core 15, back to the anode, thus completing the electrical circuit and in a direction that will retard if not completely eliminate corrosion.

When it is desired to remove and replace the anode this is accomplished by merely loosening the union 13 and unscrewing the nut 23. The "stars" or dished members can then be loosened from the interior of the nipple and the entire structure recovered. The diameter of the anode is usually smaller than the nipple 12 so that it can be introduced into the water heater therethrough. In introducing a replacing anode or in making an initial installation of an anode in an installed water heater the anode is lowered through the hot water outlet until the laterally bent ends 19 rest on top of the nipple. Thereafter, on tightening the nut 23 the dished members can be expanded into engagement with the nipple. As the basket and the dished members are of skeleton shape they do not interfere with the passage of hot water through the hot water outlet.

While the anode and its mounting means has been described and illustrated as mounted within the hot water outlet from the tank of the water heater it will be readily understood that it may be mounted in the tank in any other tubular connection or nipple that either forms a part of the installation of the tank or which has been properly applied to the tank for purposes of mounting the anode therein. The various parts of the mounting means provide pass-

ways or openings as can be seen from Fig. 4 permit the continued passage of hot water through the nipple after the device is applied to the nipple. This type of open construction makes it possible for a device embodying the present invention to be mounted in a hot water

outlet nipple without impeding the flow of hot water through the nipple to an undesirable extent.

Although the preferred form of the invention includes the fingers 19 which support the device while it is being arranged in the nipple, it will be appreciated that after the expandible members 20 and 21 have been expanded into engagement with the interior of the nipple, that they can support the anode by themselves and the invention is therefore deemed broad enough to cover the case where only expandible means are provided without any fingers 19 and in such case it would be more difficult to apply the device because of not being supported from the end of the nipple, nevertheless it is an arrangement not heretofore found in the prior art and which is useful, new, and inventive although it does not have all the advantages of the preferred form of the invention.

The dished members 20 and 21 serve the function of preventing inward collapse of the arms 18 of the cradle when the cradle is being applied to the nipple and after it has been applied to the nipple. As can be seen from Figs. 6 and 7, the arms 18 cannot move inwardly because the dished member or star 21 has been set in place and will not be able to be moved upwardly and therefore, the portions of the arms 18 defining the lower end of the slots 22 will not be able to move inwardly because of their abutting relationship with the dished member 21. In applying the device to a nipple as illustrated in Fig. 5, the portions above mentioned will be likewise incapable of moving inwardly because of their contact with the lower dished member 21 and therefore the dished members serve the purpose of preventing inward collapse of the arms 18.

Various changes may be made in the details of construction without departing from the spirit and scope of the invention as defined by the appended claims, wherein I claim:

1. A combination adapted when placed and arranged in a hot water outlet nipple of a hot water heater to support an anode within the hot water heater from the nipple and electrically connect an anode to the nipple, which combination comprises means providing horizontally spaced, upwardly extending arms adapted to lie next to the inner walls of the nipple, the arms providing fingers on the upper ends thereof adapted to engage one end of the nipple, a pair of opposed humped star-shaped members disposed within the arms, the legs of the star-shaped members extending through apertures in the arms of the first-named means to be kept in alignment thereby and to support the arms against inward collapse, means for flattening the star-shaped members to cause the legs thereof to move radially to engage the inner walls of the nipple when the combination is arranged within a nipple to thereby establish electrical connection with the nipple, and anode supporting means operatively connected to the first-named means and adapted to support an anode.

2. An anode mounting means comprising a cradle receivable in a conduit and having upwardly extending arms adapted to lie next to the walls of the conduit, said arms providing fingers at the upper ends thereof adapted to engage the upper end of the conduit, a pair of opposed dished members disposed within the cradle and having arm portions which extend through apertures in the arms of the cradle, an

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anode providing an upper partially threaded portion, there being apertures in the cradle and the dished members through which said upper portion may extend, said portion having a slidable but non-rotatable connection with the cradle, the anode providing an abutment beneath the lowermost of said dished members, and a nut on said portion adapted to be tightened against the dished members to flatten the dished members and expand the dished members into engagement with the conduit.

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