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CATHODIC PROTECTION FOR WATER SOFTENERS AND FILTERS

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Fig. 1

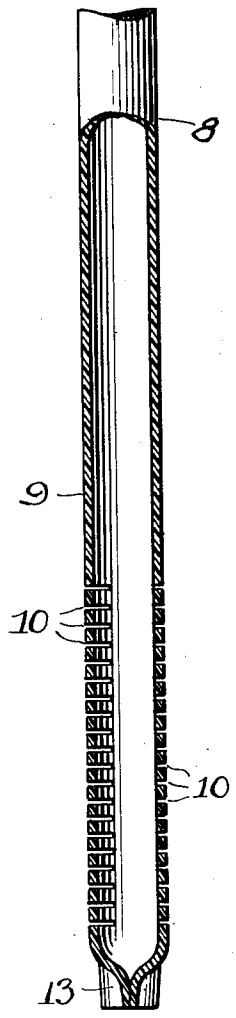
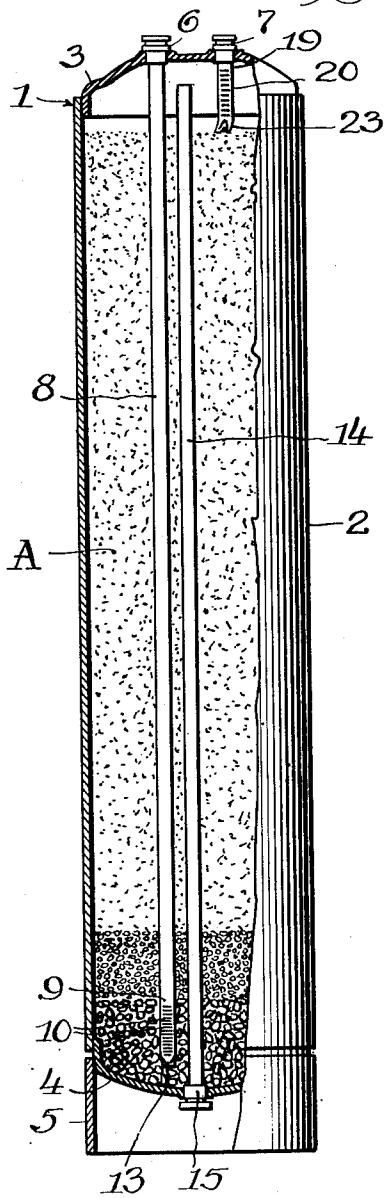


Fig. 2



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CATHODIC PROTECTION FOR WATER SOFTENERS AND FILTERS

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2 Claims. (Cl. 204—197)

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The present invention relates to cathodic protection for water softeners and filters and especially to a novel means and manner of maintaining liquid flow through a water softener or filter in which a sacrificial galvanic anode is employed.

Cathodic protection has been employed for the protection against corrosion of underground pipe lines and water storage tanks by the use of an expendable or sacrificial anode. In such water tanks the expendable anode is connected electrically to the tank or through a resistor for regulating the current flow. Such corrosion in an aqueous media is electro-chemical in nature in which galvanic cells are established through either the use of dissimilar metals in the construction or fabrication of the tanks, or due to the many anodes and cathodes of the metal used in their fabrication. The water stored in the tanks acts as an electrolyte whereby positive electric current flows from the anode to the cathode and results in solution of the metal constituting the anodic area and subsequent tank failure from the resulting corrosion.

By the use of a sacrificial anode such as a magnesium rod, or in some cases one formed of zinc or aluminum, such corrosion is substantially or entirely prevented by neutralizing the local action currents and currents resulting from the use of dissimilar metals. By providing such magnesium anode in the system, there is produced the necessary current without an external source of electric energy, and such sacrificial anode also protects the tank walls from corrosion by the formation of a calcareous coating thereon and upon the other cathodic areas within the tank.

In the protection of water heaters or other tanks where the inlet and outlet openings are relatively large, the formation of a calcareous coating constitutes no problem. However, in tanks such as employed in water softeners and filters containing a deep stratified bed of granular material or loosely packed solid particles including cation exchange material through which the water must pass in its treatment, some type or form of distributor or manifold must be provided to disperse the water at the inlet and collect at the outlet so that the water after passing through the bed may be withdrawn but without carrying along the granular material which is retained in the tank and prevented from leaving. Such distributors or manifolds are generally constructed of brass or of other metal that is cathodic to the tank and thus plating or collection of the calcareous coating upon the distributor occurs when a sacrificial galvanic anode is used. This coating results in impeding or restricting and subsequent blocking of the flow of water through the distributor.

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It is, therefore, an object of the present invention to provide a novel means and manner of maintaining flow through water softeners and filters in which sacrificial galvanic anodes are employed. More particularly, the invention comprehends a novel means and manner of cathodic protection in which the outlet and inlet manifolds or distributors are electrically insulated whereby such members are prevented from becoming cathodic with respect to the anode and tank.

The present invention further comprehends a novel means and manner of preventing restriction or stoppage of water flow through the distributors or manifolds of a water softening or filter tank by preventing the formation of a calcareous coating when a sacrificial galvanic anode is employed in the tank of such water softener or filter.

The invention further resides in the construction, combination and arrangement of parts illustrated in the accompanying drawing, and while there is shown therein a preferred embodiment, it is to be understood that the same is susceptible of modification and change, and comprehends other details, arrangements of parts, features and constructions without departing from the spirit of the invention.

The present invention is a division of my copending application Serial No. 49,163, filed September 14, 1948, now Patent No. 2,560,960, of July 17, 1951.

In the drawing:

Figure 1 is a fragmentary enlarged view, part in vertical cross section and part in side elevation, of the novel distributor or manifold forming the outlet of a water softening and filtering tank.

Fig. 2 is a view of a water softener or filter tank provided with the novel form of insulated distributor or manifold.

Referring more particularly to the disclosure in the drawing, the embodiment therein selected

to illustrate the present invention comprises a water softener unit 1 including a metal tank 2 which may be rendered corrosion-resistant by galvanizing or the like, said tank having a head 3 at its upper end, a bottom 4 and a supporting base 5. In the head is detachably mounted a pair of metal fittings 6 and 7 each preferably threaded for mounting or disassembly in spaced threaded openings and each adapted to receive and support a distributor tube or pipe.

The fitting 6 carries a depending conduit or tube 8 normally providing an outlet for the treated water or other liquid, and extending through a deep stratified bed A of loosely packed solid particles including cation exchange material, to approximately the bottom of the tank where it is provided with a distributor or manifold 9 adjacent its lower end having a plurality of relatively closely spaced and laterally disposed slots or ports 10 through which the treated water passes.

The fitting 7 carries a relatively short and depending conduit or tube 19 also provided with a distributor or manifold 20 adjacent its lower end. This conduit or tube normally provides an inlet for the entering untreated water which passes downwardly through this manifold and outwardly through a plurality of closely arranged and laterally disposed slots similar to those slots 10 in the distributor or manifold 9. Each distributor or manifold 9 and 20 is closed at its lower end at 13 and 23, respectively, whereby the liquid must pass through the slots when leaving the inlet pipe or tube 19 and when entering the outlet pipe or tube 8.

A sacrificial galvanic anode 14 projecting upwardly into the tank 2 is mounted at its lower end in a fitting 15 detachably mounted in the bottom 4 of the tank 2, and with its upper end projecting adjacent to but spaced from the underside of the head 3. This anode preferably comprises a magnesium rod for substantially preventing corrosion by neutralizing the local action currents and those resulting from the use of dissimilar metals. It is not connected to any external circuit or source of electrical energy, but produces the necessary current whereby the interior walls of the tank are protected against corrosion by superimposing, by means of the sacrificial galvanic anode, a current in the opposite direction of that between dissimilar metals and the anodic and cathodic areas in one metal, of such intensity as to cancel the normal current flow causing such corrosion and to further protect against corrosion by the formation of a calcareous coating on these walls and on other cathodic areas within the tank.

As the distributors or manifolds when formed of metal would be normally cathodic to the tank, this calcareous coating produced by the rod would collect on the distributors or manifolds and in the slots thereof unless these distributors or manifolds are protected against such clogging. These slots being normally of a size to permit the uninterrupted passage of the liquid but to prevent passage therethrough of the granular material or solid particles forming the bed A through which passes the liquid to be treated, are soon clogged by such calcareous coating resulting in stoggage of the liquid flow due to the blocking of the slots.

The bed A of granular material is a deep stratified bed of loosely packed solid particles including cation exchange material for treating the water or liquid, and as illustrated includes an upper and relatively deep layer or mass of zeolite or cation exchange material, an intermediate layer of relatively fine gravel and a bottim layer of relatively coarse gravel. However, it is to be understood that the invention is not limited thereto.

To prevent particularly the outlet manifold 9 which projects downwardly into the deep bed of granular material or solid particles from becoming cathodic, and thereby avoid the collection thereon and in the slots or ports of the calcareous coating, the entire tube or conduit 8 and its manifold 9 are insulated from the metal fitting 6 and from the metal tank 2, top 3 and other cathodic areas. Although the inlet manifold 20 does not usually project into the bed of granular material or solid particles and the water does not normally enter but rather exits through the slots or ports in this manifold, less danger of clogging of the inlet manifold is present. However, the present invention comprehends similarly insulating the inlet tube 19 and its manifold 20 from the metal fitting 7, and from the metal tank and other cathodic areas.

The outlet tube 8 and its manifold 9 and the inlet tube 19 and its manifold 20 are constructed or composed of a non-metallic insulating material such as an acetate or other plastic composition having the desired rigidity and insulating qualities or characteristics for insulating the entire tube assemblies from tank, fittings and other cathodic areas. At their upper end, these tubes are rigidly affixed or connected to the metal fittings 6 and 7 whereby they are supported in such manner as to depend therefrom.

Although I have referred to the longer pipe or tube as the outlet and the shorter as the inlet, it will be appreciated that the flow may be reversed and instead of the liquid to be treated passing through the bed of granular material in a downflow direction, it may pass in an upflow direction. Also, although I have referred more particularly to a water softener and filter tank, the invention comprehends use in a tank suitable for either a water softening, filtering or treating operation where the liquid being treated is passed through a bed or mass of granular particles.

Having thus disclosed the invention, I claim:

1. In a metal tank of the class described, a bed containing cation exchange material, an inlet fitting for the passage of the water to be treated into the tank and through the bed of material therein and an outlet fitting for the passage of the treated water outwardly to service, a sacrificial galvanic anode in and electrically connected to said tank and projecting into the bed of material for protecting the tank walls against corrosion by reversal of current flow and by formation of a calcareous coating, said tank, inlet and outlet fittings being of metal and providing cathodic areas, and an integral tube and manifold consisting of non-metallic plastic insulating material connected to and depending from each fitting into the tank for electrically insulating the entire length of the tube and manifold therefrom, said manifolds each having a plurality of closely spaced openings of such dimensions as to permit an uninterrupted flow of water but small enough to prevent normal passage therethrough of the exchange material of the bed and electrically insulated from the cathodic areas to prevent the coating from the anode from collecting on and in the openings of the mani-

fold and thereby assuring uninterrupted flow through these openings.

2. In a metal tank of the class described having a deep stratified bed of loosely packed solid particles including cation exchange material and a sacrificial galvanic anode electrically connected to and projecting into the tank and the bed therein, a metal outlet fitting in the tank and providing cathodic areas with the tank, and an integral outlet tube and manifold open at its upper end and thereat connected to and suspended from the metal outlet fitting and depending into the tank and downwardly through the particles of the bed, said outlet and manifold comprising insulating material presenting a

continuous and uninterrupted insulating surface for their entire length with the manifold being closed at its lower end and adjacent thereto provided with closely spaced openings for the uninterrupted passage of the treated water but preventing the normal passage therethrough of the material of the bed.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,155,964	Bowers et al.	Apr. 25, 1939
2,560,960	Klumb	July 17, 1951