Patent Literature

[0007]

PTL 1: Japanese Patent Application Laid-Open No. 11-092981

PTL 2: Japanese Patent Application Laid-Open No. 61-067782

Summary of Invention

Technical Problem

[0008]

To reduce the cost of the seawater pump and the seawater desalination apparatus, it is necessary to reduce the cost, not only of the metal pipe material, but also of the electrode material used for impressed current protect. The impressed current protect systems described in Patent Literature 1 and 2 use the expensive insoluble Pt electrode, which is not preferable for cost reduction.

[0009]

In view of the above circumstances, ~~it is one object~~ embodiments of the present invention seek to provide an impressed current protect system ~~capable of~~ that may improv~~inge~~ the corrosion resistance of the metal pipe material for a seawater pump and a seawater desalination apparatus at low cost and with high efficiency. ~~It is another object~~ Embodiments of the present invention also seek to provide a seawater pump and a seawater

desalination apparatus at low cost by using such an impressed current protect system.

Solutions to Problem

[0010]

~~To achieve the one object, one~~ According to a first aspect of the present invention, there is provided ~~provides~~ an impressed current protect system for preventing corrosion of a metal pipe that passes water therethrough, the system including an anode electrode for impressed current protect sandwiched, so as to be covered except for part thereof, between two insulating gaskets interposed between flanges connecting the coupler sections of the pipe, the part thereof being exposed from the gaskets and configuring a water contact surface that comes in contact with water inside the pipe, an anode electrode terminal having at least part thereof sandwiched between the gaskets, a DC power source connected to the anode electrode and the pipe via the terminal and electric wiring and flowing an anticorrosion current to the water passing section of the pipe, a first seal member that seals the flanges with respect to the gaskets, and a second seal member that seals the gaskets with respect to the terminal or that seals the anode electrode with respect to the terminal.

[0011]

~~To achieve the another object, another~~ According to a second aspect of the present invention, there is provided ~~provides~~ a seawater pump including a metal pipe, a rotating shaft provided inside the metal pipe, an impeller provided at the end of the rotating shaft, and a motor that rotatively drives the rotating shaft and the impeller, the flow of water from the impeller being pumped up to be guided inside the metal pipe, in which the metal pipe includes the impressed current protect system.

[0012]

~~To achieve the another object, another~~ According to a third aspect of the present invention, there is provided ~~provides~~ a seawater desalination apparatus including a seawater intake well that stores seawater taken thereinto, a filtered seawater tank that stores the seawater that flows from the seawater intake well to a filter device where the seawater is filtered, a reverse osmosis membrane module that separates, into desalinated water and salt-concentrated water, the filtered seawater from the filtered seawater tank led by a high pressure pump via a protective filter, a produced water tank that stores the desalinated water separated by the reverse osmosis membrane module, and a power recovery turbine disposed coaxially with the high pressure pump and recovering the salt-concentrated water separated by the reverse osmosis membrane module to discharge the recovered salt-concentrated water into a concentrated water pipe, the

seawater intake well, the filter device, the filtered seawater tank, the protective filter, the reverse osmosis membrane module, the produced water tank, the high pressure pump, and the power recovery turbine being connected by metal pipes, in which the metal pipes include the impressed current protect system.

## Advantageous Effects of Invention

[0013]

According to embodiments of the present invention, it is possible to provide the impressed current protect system capable of improving the corrosion resistance of the metal pipe material for the seawater pump and the seawater desalination apparatus at low cost and with high efficiency. It is also possible to provide the seawater pump and the seawater desalination apparatus at low cost by using the impressed current protect system according to embodiments of the present invention.

## Brief Description of Drawings

[0014]

Fig. 1 is a schematic sectional view of a first embodiment of an impressed current protect system according to the present invention.

Fig. 2 is a principle view of the impressed current