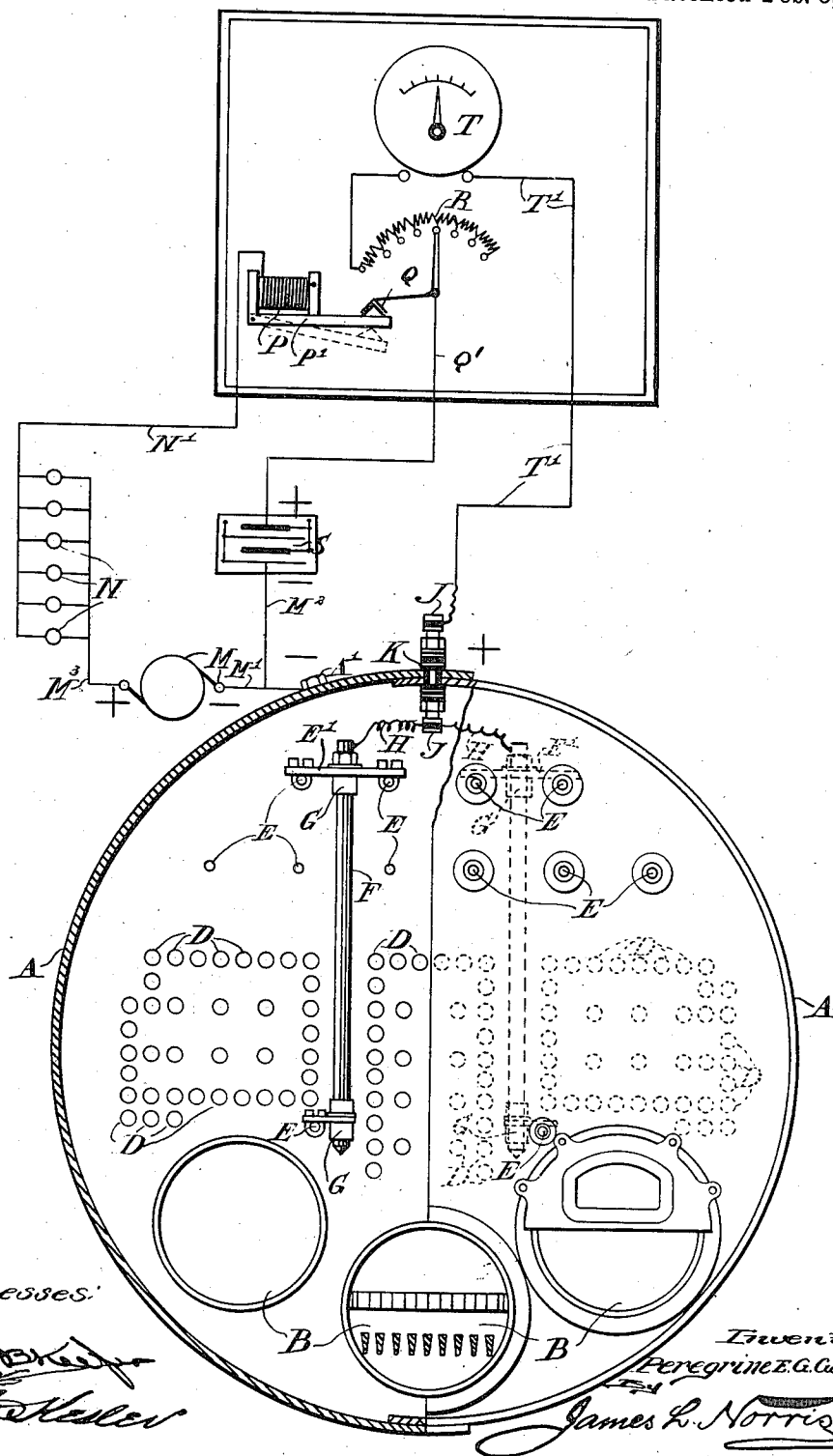


P. E. G. CUMBERLAND.
 MEANS FOR PREVENTING THE CORROSION OF THE INTERNAL PARTS OF BOILERS
 DUE TO ELECTROCHEMICAL ACTION.
 APPLICATION FILED DEC. 22, 1908.

948,968.

Patented Feb. 8, 1910.



Witnesses:

[Handwritten signatures of witnesses]

Inventor

Peregrine E. G. Cumberland

[Handwritten signature of James L. Norris]
 James L. Norris

UNITED STATES PATENT OFFICE.

PEREGRINE ELLIOTT GLOUCESTER CUMBERLAND, OF ST. KILDA, VICTORIA,
AUSTRALIA.

MEANS FOR PREVENTING THE CORROSION OF THE INTERNAL PARTS OF BOILERS DUE
TO ELECTROCHEMICAL ACTION.

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Specification of Letters Patent.

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Application filed December 22, 1908. Serial No. 468,861.

To all whom it may concern:

Be it known that I, PEREGRINE ELLIOTT GLOUCESTER CUMBERLAND, subject of the King of Great Britain, residing at 85 Barkly street, St. Kilda, in the State of Victoria, Commonwealth of Australia, have invented certain new and useful Improvements in Means for Preventing the Corrosion of the Internal Parts of Boilers Due to Electrochemical Action, of which the following is a specification.

This invention relates to an improved means for preventing the corrosion of the internal parts of boilers which are in contact with water due to electro-galvanic or electrochemical action of the type in which the inside of a boiler shell is provided with anodes connected to an outside source of current and submerged or partly submerged in the water, the conductors for same passing through the shell and being insulated therefrom and the shell itself forming the cathode.

The object of my invention is to provide the means illustrated whereby this electrochemical action is nullified and the consequent correction and decomposition avoided in a convenient and practical manner.

In the accompanying drawing:—A represents the shell of a marine boiler of any well-known construction having fire boxes B, combustion chambers, tubes D and stay rods E in the ordinary way. Within the boiler A, I provide a number of electrodes F of preferably iron rods arranged in various convenient positions in the interior of the said boiler. These electrodes are thoroughly insulated from the metallic portions of the boiler except through the medium of the water. In the accompanying drawings I have shown these iron electrodes F as arranged between the nests of tubes D. These iron rods F are supported in porcelain or earthenware sockets G held upon cross bars or brackets E' clamped to the tie-bolts E. Each of these rods F is connected by a wire H, above the surface of the water, to a bolt J which passes through an insulating pressure plug K, the said bolt J having insulating washers or rings by which it is kept out of contact with the shell A of the boiler. The electrical arrangements are as shown there being preferably two alternative circuits as

adapted for ship-board use where a dynamo, not in constant use, is installed. In the dynamo circuit, the negative pole of the dynamo M is connected by means of a wire M' direct to a terminal A' upon the shell A of the boiler and also by a wire M² to storage batteries S. The positive pole or the dynamo M is connected by a wire M³ to a series of lamps N or other measured resistances and thence by a wire N' to an automatic bobbin cut-out P. This automatic cut-out P has a hinged armature P' which only comes in contact with the terminal Q when the current is passing through the bobbin P and as soon as the current ceases through the dynamo M stopping, the said armature P' falls cutting out the circuit. At the terminal Q is provided a shunt, one wire Q' of which passes to the storage batteries S while the other wire passes to variable resistances R, thence to an ammeter T from which a wire T' is lead to the bolt J in the pressure plug K. By this arrangement it will be seen that when the dynamo M is in operation the armature P' allows of the current passing both through the storage batteries S, charging the same and through the boiler, from the electrodes F to the shell A. As soon as the dynamo M stops the armature P' falls and the current then flows from the storage batteries S through the boiler in the same way. A continuous current is thus always maintained and by the resistances is regulated to be of equal E. M. F. or slightly higher than that caused by the differences of potential of the metal structure comprising the boiler. Thus the metal structure comprising the boiler is brought into coöperation and any corrosion or decomposition is effected upon the iron rods F which may be renewed from time to time.

I claim:

The combination with a boiler having a plurality of flue tubes, of a plurality of metallic electrodes disposed within the boiler between the tubes and engaging the water in the boiler, means for removably and replaceably holding the electrodes within the boiler and including devices for insulating the said electrodes from the boiler, conducting means connected to the electrodes, and a source of

electric current connected to the said conducting means and the shell of the boiler, the electrodes constituting anodes and the boiler shell forming a cathode, the metal
5 structure comprising the boiler being brought into parallel and the corrosion or decomposition effected upon the metal electrodes.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses. 10

PEREGRINE ELLIOTT GLOUCESTER CUMBERLAND.

Witnesses:

CLEM A. HACK,

CHARLES HARKETT.