J. F. DONOGHUE.

Anti-Incrustation-Battery for Boilers.

No. 160,009. Patented Feb. 23, 1875.

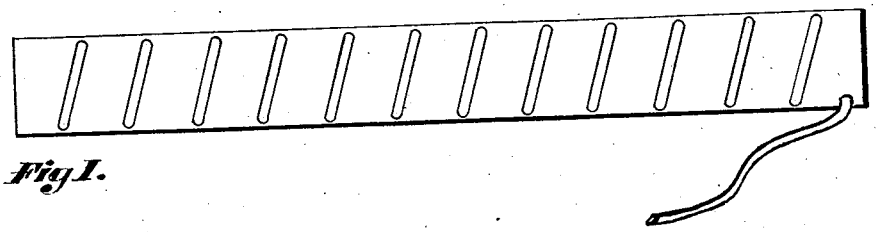

Fig I.

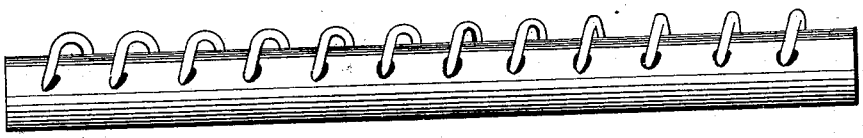

Fig II.

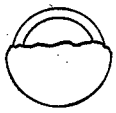

Fig III.

Witnesses

Chas. A. Munson

E. G. Peach

Inventor

Jno. F. Donoghue

by his attys

Gardiner & Hyde

UNITED STATES PATENT OFFICE.

JOHN F. DONOGHUE, OF SPRINGFIELD, MASSACHUSETTS.

IMPROVEMENT IN ANTI-INCRUSTATION BATTERIES FOR BOILERS.

Specification forming part of Letters Patent No. **160,009**, dated February 23, 1875; application filed July 6, 1874.

To all whom it may concern:

Be it known that I, JOHN F. DONOGHUE, of Springfield, Hampden county, State of Massachusetts, have invented an improved device to be used in connection with a steam-boiler, to remove any scale or deposit therein, as well as prevent the accumulation or formation of such upon any surface within the boiler, of which the following is a specification:

My invention has for its principle the setting up of a continuous galvanic current within the water-space of the boiler through the alkali or acid always present in the water itself, and from which solution such scale or deposit is due; and my battery consists in one or more bars of zinc spanned across its face by a series of copper arches, which rise to a certain distance clear of the zinc, and are separated each by a short space, so as to allow the water in the boiler, representing the solution, to surround them while coming in contact with the adjacent zinc, the distance between the copper arches representing the space between the cells.

In Figure I is shown a plan view of one battery, Fig. II a side view, and Fig. III an end view.

In construction I take a coil of copper wire of the form of a coil-spring, and, laying it in a mold of slightly greater diameter, run zinc to inclose a portion of the coil, to leave the remaining portion to form the arches before mentioned, so that the copper and zinc will remain united while any zinc remains. The battery so formed has the wire at one or both ends prolonged clear of the zinc to extend the circuit, and when more than one zinc bar is used I unite by the wire the contiguous ends and leave the far ones, that constitute the poles, to have the circuit established between them by the water and iron of the boiler coming in contact with them, so that an extended magnetic current is induced that affects all of the surface of the iron against which the water in the boiler comes, to effectually prevent the attachment of scale, and to loosen and decompose all salts and alkaline deposits previously left.

Where only a one-bar battery is used the agitation of the water consequent upon boiling brings all of it under the influence of the current, to have the impurities decomposed to fall in loose scales to the bottom of the boiler, where at intervals they can swept out.

The bars occupy little room, and can be laid in the bottom of the boiler or between the flues, or in any convenient position within the boiler.

The bar of zinc will of itself, when laid upon the bottom of the boiler, form a battery, but the current is much weaker, and a portion of the zinc unconsumed adheres to the boiler so firmly as to require to be detached by the chisel; but when united with the copper wire, it becomes entirely consumed and the wire left uninjured, to be used repeatedly, and the galvanic action at the same time so much increased that the incrustations of a foul boiler are soon decomposed.

I am aware that galvanic piles have been used before for the purpose of cleaning boilers, and do not make any claim to the principle thus illustrated; but

What I claim is—

The battery for use in boilers, consisting of a spiral of copper wire partially incased or embedded longitudinally in a base of zinc, substantially as and for the purpose shown and described.

JNO. F. DONOGHUE.

Witnesses:
R. F. HYDE,
A. M. COPELAND.