

UNITED STATES PATENT OFFICE.

JOHN BRADBURN DODDS, OF NEWCASTLE-ON-TYNE, AND JOHN REED
FOTHERGILL, OF WEST HARTLEPOOL, ENGLAND.

INCRUSTATION PREVENTIVE.

SPECIFICATION forming part of Letters Patent No. 477,357, dated June 21, 1892.

Application filed May 15, 1891. Serial No. 392,886. (No specimens.) Patented in England June 8, 1889, No. 9,573.

To all whom it may concern:

Be it known that we, JOHN BRADBURN DODDS, residing at Newcastle-on-Tyne, in the county of Northumberland, and JOHN REED FOTHERGILL, residing at West Hartlepool, in the county of Durham, England, subjects of the Queen of Great Britain and Ireland, have invented the manufacture and application of a certain fluid preparation for preventing or lessening corrosion and pitting in steam-boilers, (for which we have obtained a British patent, No. 9,573, dated June 8, 1889,) of which the following is a specification.

As is well known, corrosion and pitting occur in the interiors of steam-boilers, and various means have been resorted to with the view of obviating the evil. One of these, which is adopted especially in marine-boilers, consists in placing inside the boiler, either suspended in trays or hangers or fastened to and in metallic contact with the metal of the boiler or applied in some other manner or form, slabs, blocks, or plates of zinc. These have been found to exercise a beneficial influence to a certain extent, but are open to the objection that the whole of the zinc required must be placed in the boiler before closing up and filling the boiler with water. It results that during the first few days' steaming there is a large quantity of zinc very active. Then from various causes—for instance, oxidation—the zinc ceases to be effective just when it is required to act most efficiently—that is to say, as the source or cause of corrosion becomes more active, which it does the longer the boiler is under continuous steam. Now in order to obviate this difficulty according to our invention, we manufacture zinc solution, as hereinafter described, and apply the same to steam-boilers at regular or stated intervals, either with the feed-water by a separate pump or by injection or by other similar or suitable methods, by which means we are enabled to provide and maintain a steady, constant, and effective preventive to corrosion, and thereby to preserve the boilers from corrosion and pitting; or the solution may when thickened, as hereinafter described, be used as a wash or paint, applied by a brush or in some other convenient and similar manner to particular corroded or pitted places in the

boiler while the water is out of the boiler or to the material of new boilers during construction.

In the manufacture of the zinc solution we add to water suitable quantities of sodic hydrate (NaHO) or potassic hydrate (KHO) and of zinc (Zn) rendered sufficiently small to be readily soluble, and we heat the whole until the sodic hydrate or potassic hydrate, as the case may be, has dissolved its full proportion of zinc, after which more water is added and the whole allowed to cool and settle, and the clear liquor is drawn off for use according to our invention; or, instead of metallic zinc, as described, galvanized iron may be used, cut into convenient-sized pieces to facilitate the operation. The sodic hydrate or potassic hydrate, as described, will dissolve the zinc and leave the iron intact; or, zinc salts may be used, in which case ammoniac hydrate (H_4NHO) could be substituted for sodic or potassic hydrate.

In carrying out this invention satisfactory results may be obtained by the use of an open or covered or closed iron vessel, capable of holding any desired quantity of liquor, which is fixed in a convenient position, such as to admit of the ready application of constant and steady heat either by gas, fire, or steam. For the purpose of illustration, say, the iron vessel holds one hundred gallons. We place about fifty gallons of clean water in this vessel and add thereto about one hundred and sixty-eight pounds sodic hydrate (NaHO) or potassic hydrate (KHO) and about fifty-six pounds of zinc (Zn), the zinc being first "feathered" by melting and pouring into water or in some other of the various known methods, whereby it is caused to present extended surfaces and so facilitates its solution, or galvanized iron cut in convenient-sized pieces may be substituted for the zinc. Heat is gradually applied to the vessel, and a temperature of about 212° Fahrenheit maintained for about ten hours, or until the sodic hydrate or potassic hydrate, depending on the percentage of sodic oxide (Na_2O) or potassic oxide (K_2O), respectively, which they contain, shall have dissolved its full proportion of zinc.

When zinc salts are used, ammoniac hydrate

may be substituted for sodic or potassic hydrate. The effect of this will be to precipitate hydrated oxide of zinc, hereinafter referred to as the zinc base derived from a zinc salt and which when the mixture is heated
5 will be dissolved in the ammoniac hydrate. The vessel is then filled up with clean water, so that the whole measures one hundred gallons. The heat is withdrawn and the liquor
10 allowed to cool down and settle, when the clear liquor is drawn off, which, as already stated, constitutes the zinc solution in accordance with our invention for application to steam-boilers while under steam; but when
15 the solution is required to be used as a wash or paint it may be thickened by mixing with it Portland cement or lime or other similar substances, which will adhere to the material of the boiler and which in themselves are not
20 corrosive, or the solution may be evaporated

or boiled down to the necessary consistency required.

What we claim is—

The process of preventing or removing corrosion in steam-boilers, which consists in introducing into the boiler a solution of an alkaline zincate. 25

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOHN BRADBURN DODDS.
JOHN REED FOTHERGILL.

Witnesses:

A. B. GOLDSBROUGH,
No. 234 Hamilton street, Newcastle-on-Tyne,
Solicitor's Clerk.

A. E. DAWSON,
Belle Vue Road, Low Fen, Gateshead, Solicitor's Clerk.