

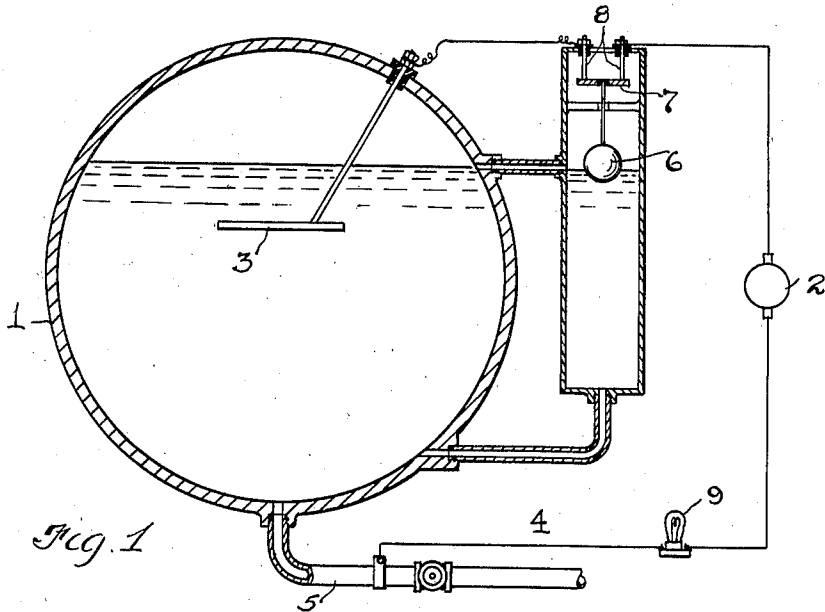
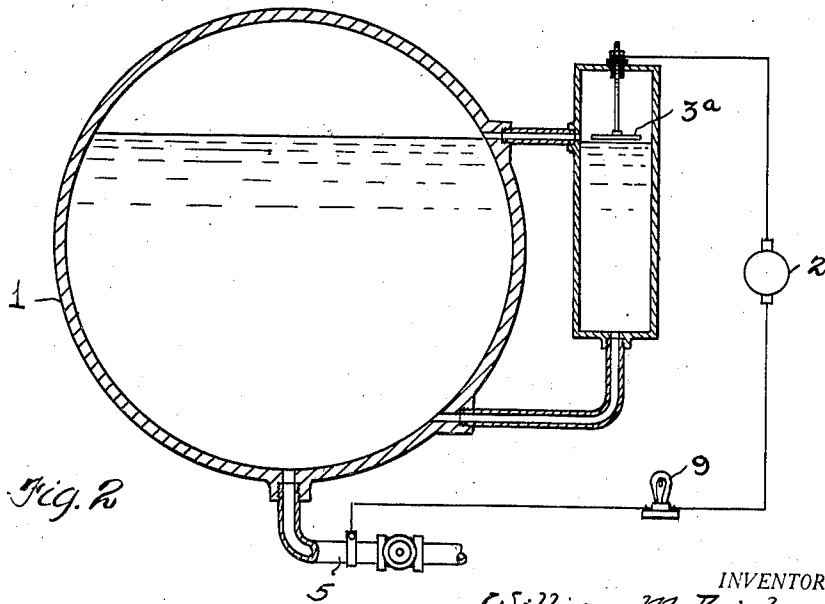
Sept. 29, 1931.

W. M. REICHART

1,825,477

SCALE PREVENTION IN BOILERS OR THE LIKE

Filed Aug. 14, 1926



INVENTOR.
William M. Reichart
BY
Fay, Oberlin & Fay
ATTORNEYS.

UNITED STATES PATENT OFFICE

WILLIAM M. REICHART, OF CLEVELAND, OHIO, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE EFFENARE MANUFACTURING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO

SCALE PREVENTION IN BOILERS OR THE LIKE

Application filed August 14, 1928. Serial No. 129,118.

This invention relates more particularly to scale-prevention in steam boilers, water heaters or the like. It was long ago proposed to prevent scale formation by passing an electric current through the boiler to be protected and the water contained therein, but such expedient has never come into serious usage, partly because of instances of manifest failure, probably from lack of proper current or proper circuiting, and partly because of instances of apparent electrolytic damage to the boiler. The practical prevention of scale in an effective degree and without damage to the boiler is however, accordingly highly desirable.

To the accomplishment of the foregoing and related ends, the invention, then, consists of the features hereinafter fully described, and particularly pointed out in the claims, the annexed drawings and the following description setting forth certain features embodying the invention, such disclosed means and procedure constituting, however, but few of various forms in which the principle of the invention may be used.

In said annexed drawings:—

Fig. 1 is a schematic representation of one embodiment of my invention; and Fig. 2 is a similar view of another form.

The reference character 1 in the drawings designates a boiler or the like, the particular type and form being immaterial to the present invention, and arranged to supply an electric current is a suitable source of current 2. In the illustrative embodiment shown in Fig. 1 an electrode 3, insulated from the boiler, is immersed in the boiler-water, and is connected in circuit with the source of current-supply. The circuit is completed by a lead 4 connected to the boiler, preferably at some point rather remote from the electrode, conveniently for instance to the blow-off pipe 5 or the feed line. Included in the circuit is a means for intermittently interrupting the current. I have found that it is unnecessary to apply the current in the steady manner heretofore suggested in the art. In fact it is much better for results and for the boiler itself to interrupt the current; and the rate of interruption furnished by the

water-level itself in the fluctuating rise and fall thereof as occasioned by ebullition surges, pump strokes, etc., constitutes a proper and especially practicable rate of interruption. As shown in Fig. 1, the fluctuations of the water surface are communicated to a float 6 which carries a bridge contact plate or disk 7 capable of contacting with and bridging the contact-points 8 mounted in an insulated manner in the path of the bridging disk. The contact points 8, as will be understood, are in the circuit with the electrode 3 and the source of current 2. This contact device may be mounted at any convenient point, for instance one desirable arrangement being at the top of the water column connected with the boiler. Where the source of current supply is not exactly that suited to the use here contemplated, a resistance element, preferably in the form of a resistance lamp and pilot light 9 combined may be included in the circuit. In this manner, not only is the resistance necessary furnished but at the same time there is provided a tell-tale or pilot showing the condition of operation in the circuit. For example, in an installation employing a 110 volt current, a 40 watt lamp is generally advantageous. An alternating current may be used, but preferably I employ a direct current, and in such case it is desirable to connect the positive pole to the boiler and the negative pole to the electrode.

In the embodiment shown in Fig. 2, the general arrangement is the same as explained, only here the layout is still further simplified in that the water surface instead of carrying a float up and down, directly makes and breaks the circuit on the electrode 3a, which is mounted, insulatively, so as to be in the path of the fluctuating rise and fall and thereby alternately be covered and uncovered or at least contacted and freed. This electrode again may be mounted in the boiler if desired, preferably however it may be installed in the top of the water column with which most boilers are equipped. It will thus be seen that the current flows through the circuit including a boiler and the contained water, and the electrode, the current

being made and broken as the fluctuating rise and fall of the water surface intermittently contacts with the electrode. Where the resistance and pilot lamp 9 is employed, the condition of current flow from the circuit is again also indicated, as described. As in the case of the embodiment in Fig. 1, the connection to the boiler may be made at any convenient point, preferably rather remote from the location of the electrode, and for instance on the blow-off 5 or feed line.

In operation, current being supplied through the circuit, with the rise and fall of the water level, the current is intermittently interrupted, either by the float and contact mechanism if such be used, or by the direct approach and recession from the electrode, where such form of circuit control is employed. With a combined resistance and indicator lamp, the current may be cut down to the extent desired, where the source of supply is that of the usual voltage of lighting systems, and at the same time the telltale light shows the condition in the circuit. In this manner, the boiler or the like may be adequately guarded against scale deposit, while at the same time by reason of avoidance of unnecessary intense and prolonged current flow, danger of damage to the metal is avoided.

Other modes of applying the principle of my invention may be employed, change being made as regards the features herein disclosed, provided the steps or means stated in any of the following claims or the equivalent of such be used.

I therefore particularly point out and distinctly claim as my invention:—

1. A method of preventing scale-formation in boilers or the like, which comprises supplying an electric current to a circuit including such boiler or the like and the water therein and an electrode in relation to the water, and intermittently interrupting such current by surface fluctuations in the water.

2. A method of preventing scale-formation in boilers or the like, which comprises supplying an electric current to a circuit including the boiler or the like, the water contained therein, and an electrode near the average water line, and intermittently making and breaking such current flow by the fluctuations of the water level to and away from the electrode.

3. In apparatus for preventing scale-formation, in combination with a boiler or the like, an electrode insulated therefrom, and means dependent upon fluctuations in the water level for providing an intermittent electric current to a circuit including such boiler and electrode.

4. In apparatus for preventing scale-formation, in combination with a boiler or the like, an electric circuit including such boiler and water therein, and means for providing

an intermittent electric current to the circuit, said means including a circuit-control element positioned in the path of fluctuations of the water surface.

5. In apparatus for preventing scale-formation, in combination with a boiler or the like, an electric circuit including such boiler and water therein, and means for providing an intermittent electric current to the circuit, said means including a combined contact element and electrode insulated from the boiler and positioned in the path of fluctuations of the water surface.

6. In apparatus for preventing scale-formation, the combination with a boiler or the like; of a relatively small auxiliary chamber adapted to be attached to such boiler and having its walls independent thereof; means for attaching and connecting said auxiliary chamber with such boiler, said means including a water pipe; and an electrode insulatively mounted in said chamber and adapted to be in a circuit including the water of the boiler and a source of electric current.

7. In apparatus for preventing scale-formation, the combination with a boiler or the like; of an auxiliary chamber; pipe connections for supporting said chamber on said boiler and providing water passage therebetween; an electrode insulatively mounted in said auxiliary chamber and adapted to be in a circuit including the water of the boiler and a source of electric current; and means for providing an interrupted current in such circuit.

8. The method of inhibiting scale in boilers or the like, which comprises applying to a circuit including such boiler and the water an electric current sufficient to control the scale, and interrupting the current before the action progresses into an electrolytic attack upon the boiler-metal.

9. The method of inhibiting scale in a boiler or the like, which comprises applying to such boiler an electric current of strength capable of electrolytic action and interrupting such current for intervals that the actual time of current flow is insufficient to damage the metal of such boiler.

10. The method of inhibiting scale in a boiler or the like, which comprises applying an electric current by an electrode external thereto and passing the current through the water in such boiler.

11. In apparatus for inhibiting scale, the combination with a boiler or the like, of external means connectible or disconnectible for carrying an electrode in circuit communication with the water of such boiler, whereby to provide an electric circuit including the electrode, such boiler and the water thereof.

12. In apparatus for inhibiting scale, the combination with a boiler or the like, of a separate electrode-carrying chamber and an electrode therein, and means for connecting

said electrode chamber to such boiler in the vicinity of its upper portion.

13. In apparatus for inhibiting scale, a boiler or the like, an electric circuit including the water and the boiler, and means supplying a periodic current of a low rate of interruption to such water and boiler.

Signed by me this 3 day of August, 1926.

WILLIAM M. REICHART.

10

15

25

30

35

40

45

50

55

0

65