

(No Model.)

F. J. CLAMER.

GALVANIC BOILER CLEANING COMPOUND.

No. 387,146.

Patented July 31, 1888.

FIG. I.

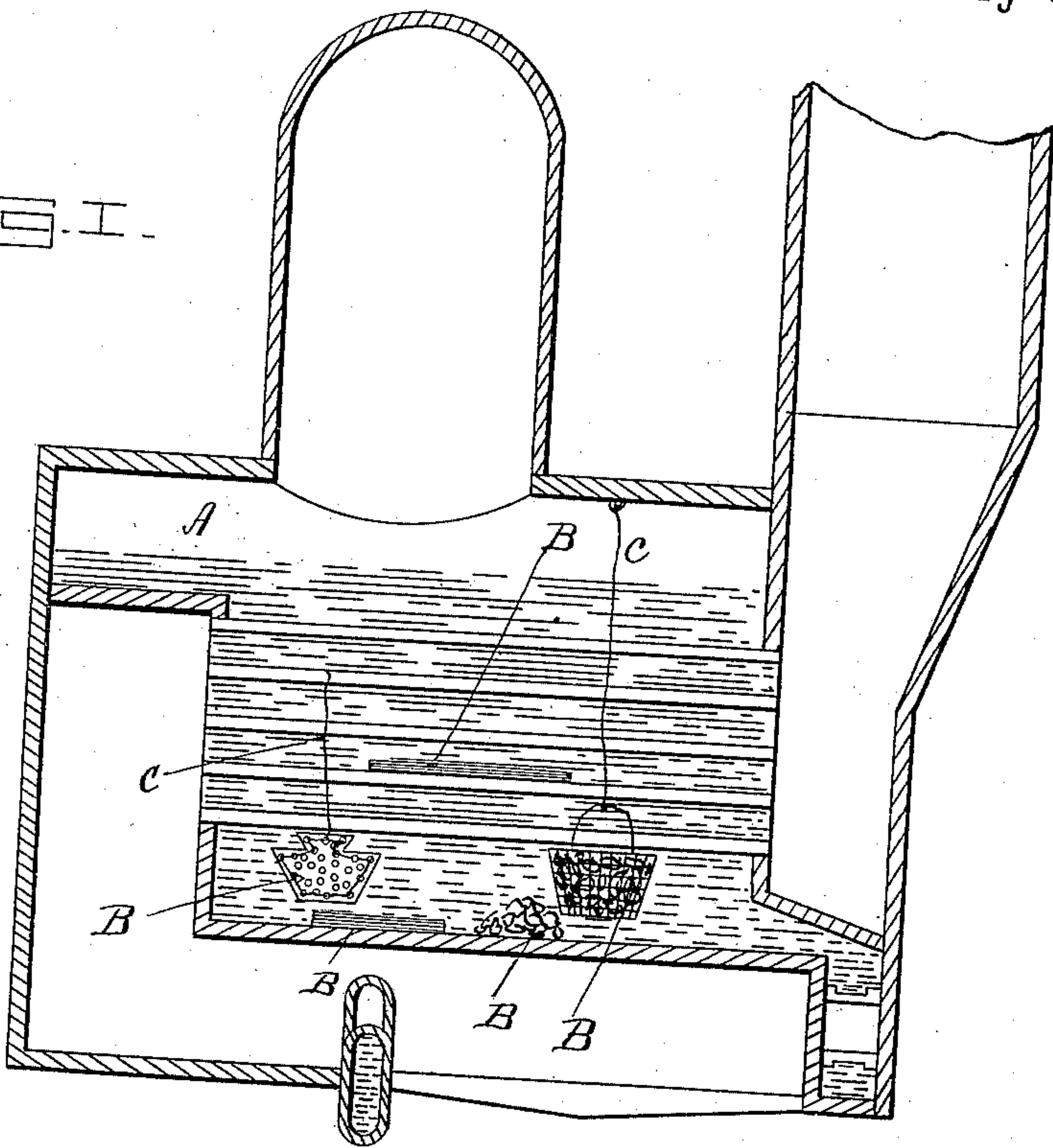


FIG. II.

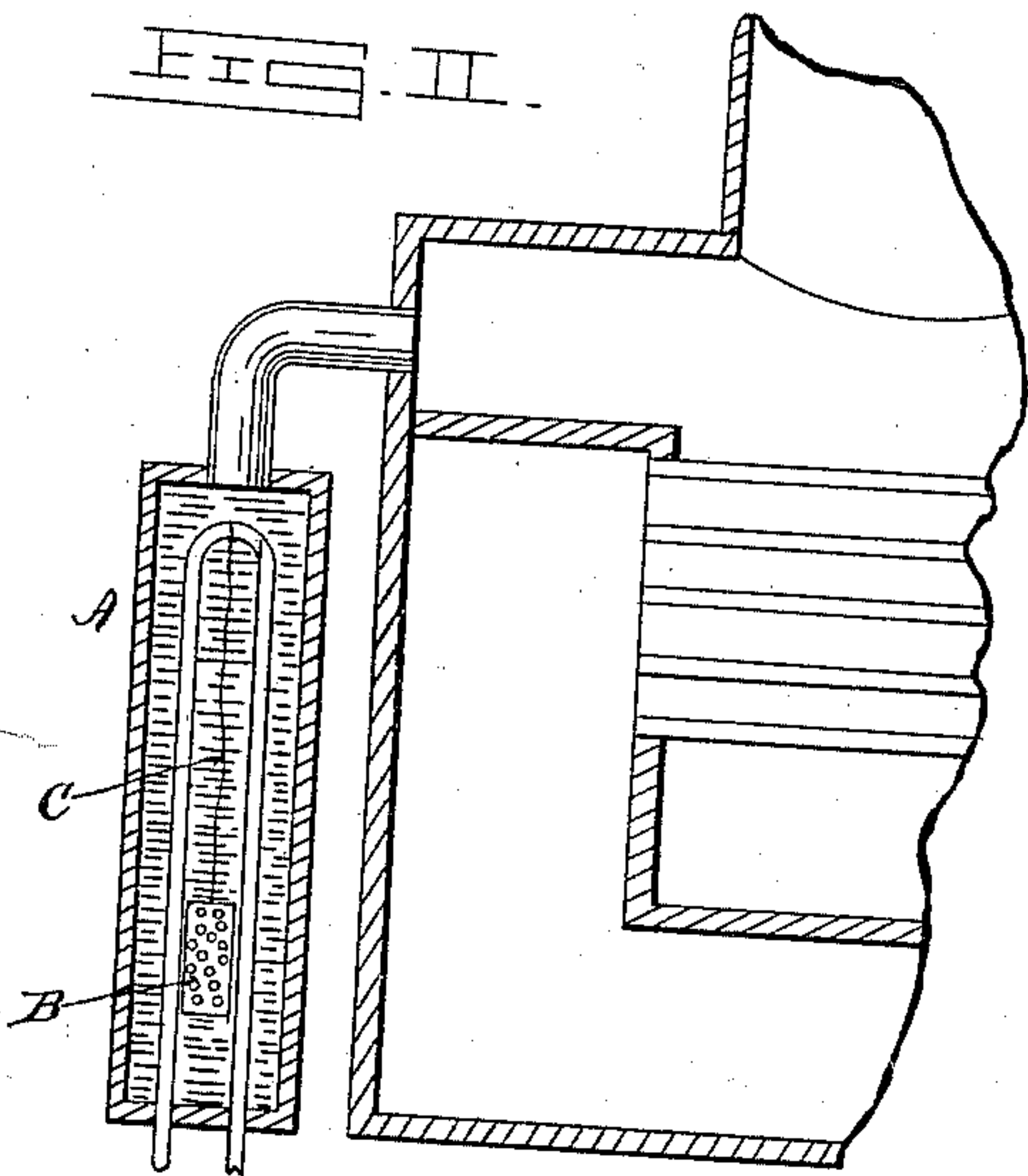
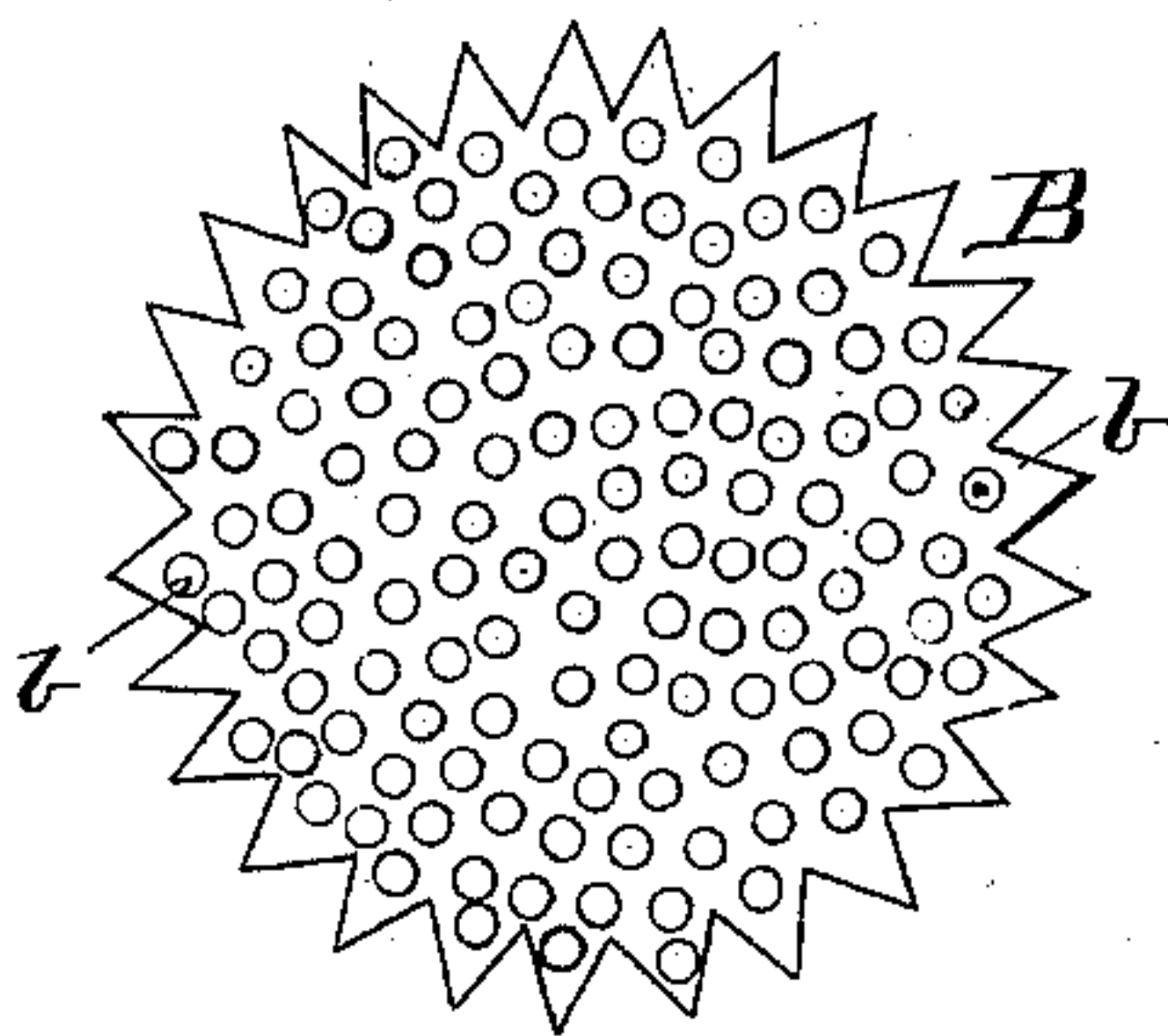


FIG. III.



Witnesses.

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Inventor,

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By his Attorney

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UNITED STATES PATENT OFFICE.

FRANCIS J. CLAMER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF
TWO-THIRDS TO CHARLES WOLTERS AND JOSEPH G. HENDRICKSON,
BOTH OF SAME PLACE.

GALVANIC BOILER-CLEANING COMPOUND.

SPECIFICATION forming part of Letters Patent No. 387,146, dated July 31, 1888.

Application filed January 31, 1888. Serial No. 262,508. (No specimens.)

To all whom it may concern:

Be it known that I, FRANCIS J. CLAMER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Galvanic Boiler-Cleaning Compounds; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form part of this specification.

My invention relates to means for cleaning or removing what is technically known as "boiler-scale" from steam boilers and generators and for preventing the formation of such scale therein.

In an application filed on even date herewith, Serial No. 262,506, I have described and claimed zinc as an agent or means for producing these results, and in a second application, also filed on even date herewith, Serial No. 262,507, I have described and claimed a metallic compound consisting of zinc and phosphorus for the same purpose in other conditions of water.

The present invention contemplates the combination with said compound of a third element or ingredient—to wit, copper, which I introduce in waters strongly impregnated with acids or alkalies, or both. A piece of such compound (zinc, phosphorus, and copper) placed in the water in or to be fed into a steam-boiler will entirely prevent the formation of scale, will neutralize and destroy the hydrogen gases, and will dissolve and break up the scale previously formed, thus restoring an incrustated boiler to its original state of cleanness and purity.

As I believe the compound described and claimed in this application to be new for the purpose described, I do not desire to be understood as limiting myself to any particular manner of applying or using the same, as its good effects will be produced irrespective of the manner in which the compound is employed;

but I prefer to suspend the compound in the water of the boiler-generator or preliminary heating device in the manner set forth in the two applications to which I have made reference hereinbefore; and it will also be understood that the compound produces its effect whether placed in the water in the boiler or generator directly or in a preliminary heating device for water to be fed into the boiler or generator; and I prefer to use some conducting metal for a suspending means for the compound when it is suspended—as, for instance and by preference, copper wire or other copper connection; and where the compound is suspended in a net, basket, or bag, as may be done to utilize broken pieces, &c., I prefer to form the basket of copper wire.

As described in the applications already referred to, the composition may be formed into any convenient shape—as, for instance, a plate or mass of any other shape—and I prefer to perforate, indent, or serrate the said plate or mass to increase its effective exposed surface.

The accompanying drawings illustrate what I consider the best means for carrying my invention into practice.

Figure 1 is a section of a boiler with the composition suspended, and also placed upon the boiler-iron. Fig. 2 is a section of a feed-water heater applied to a boiler with the composition in it. Fig. 3 is a face view of a plate having perforations, serrations, &c., to expose a greater superficial area of the composition.

Similar letters of reference indicate corresponding parts in all the figures.

A is the boiler, generator, or heater, and B the metallic compound which I place therein. This compound, being zinc, phosphorus, and copper, may be made in the form of a plate or mass, as shown at the left hand in Fig. 1 and in Fig. 3, perforated, indented, or serrated in order to increase its exposed area, as shown at b; or it may be in the plane form of a mass or plate, or in broken pieces, as shown in the basket, bag, or net to the right hand of Fig. 1; and in whatever shape the compound is formed it may be applied either by suspending it or placing it directly upon the boiler-iron, both

of which methods are shown in Fig. 1; or it may be placed in the water of the boiler, generator, or heater in any other way that is convenient, as upon the tubes or elsewhere. I prefer, however, to suspend it, for the reasons given in my applications already referred to, because the results are better when suspended; and when suspended a conducting wire or connection, C, is employed, preferably copper, which is attached to the tubes, braces, or other parts of the boiler above; and when the perforated plate is employed the wire will be interlaced in the openings *b*, as shown, and when the basket, net, or bag is used this is preferably made of the same conducting substance as wire C.

With the copper wire to suspend the part B, I believe it practicable to dispense with copper as an element in the plate; but it will be found preferable, I think, to have the compound itself contain all three elements.

It will be understood that the number of plates or parts B may be varied according to the requirements of different-sized boilers or generators. In boilers where sufficient extent of surface may be had upon one plate or mass one plate may be found more convenient than a larger number. In larger boilers, where more than one plate is necessary, I prefer to place the plates at regular intervals therein, so that their effect is more thoroughly diffused over the boiler. The composite metal (zinc, phosphorus, and copper) suspended in the water of a boiler, generator, or feed-water heater creates a galvanic current in the water, which cleanses it from all scale-producing elements,

separating the acids from the alkalies and preventing the formation of scale from these causes and from the production of hydrogen gases, which the presence of the copper destroys, and also loosens and dissolves the already deposited scale, thus completely cleansing the boiler or generator and restoring it to usefulness and prolonging its life, the phosphorus acting as a deoxidizing metalloid in this composition, as it does where it is combined with zinc alone.

For ordinary water I have found that the composite metal may be made of about the following proportions: sixteen (16) parts of zinc, one (1) part of phosphorus, and one (1) part of copper; but it will be understood that these proportions can be varied to any extent required by the character of the water.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A composite metal for preventing the formation of scale in and removing scale from steam boilers and generators, consisting of zinc, phosphorus, and copper.

2. A plate or mass of zinc, phosphorus, and copper, perforated, indented, or serrated for use in water in and to be fed into steam boilers and generators, as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

FRANCIS J. CLAMER.

Witnesses:

J. G. HENDRICKSON,
I. N. KALB.