

(No Model.)

F. J. CLAMER.

GALVANIC BOILER CLEANING COMPOUND.

No. 387,145.

Patented July 31, 1888.

FIG. I.

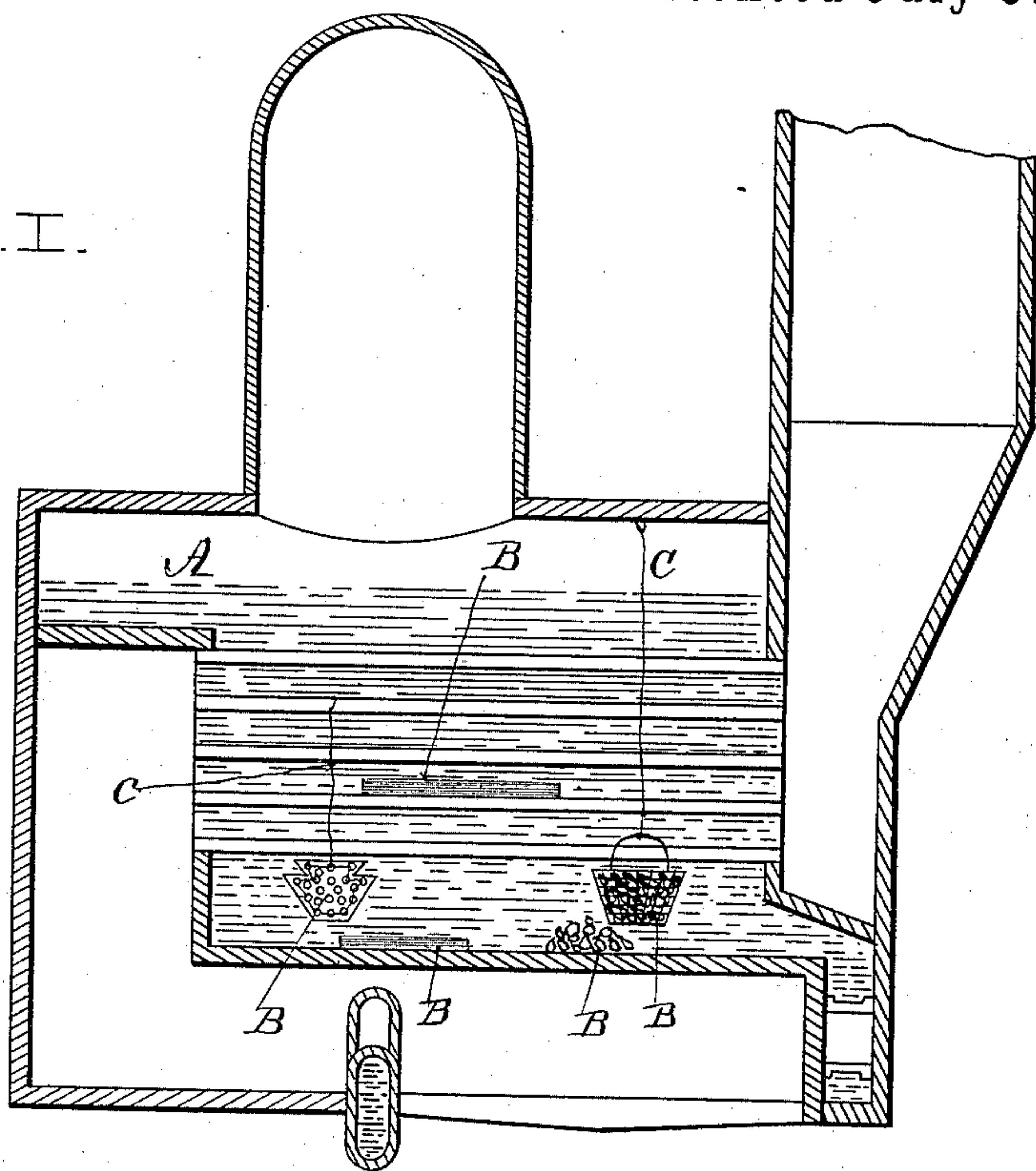


FIG. II.

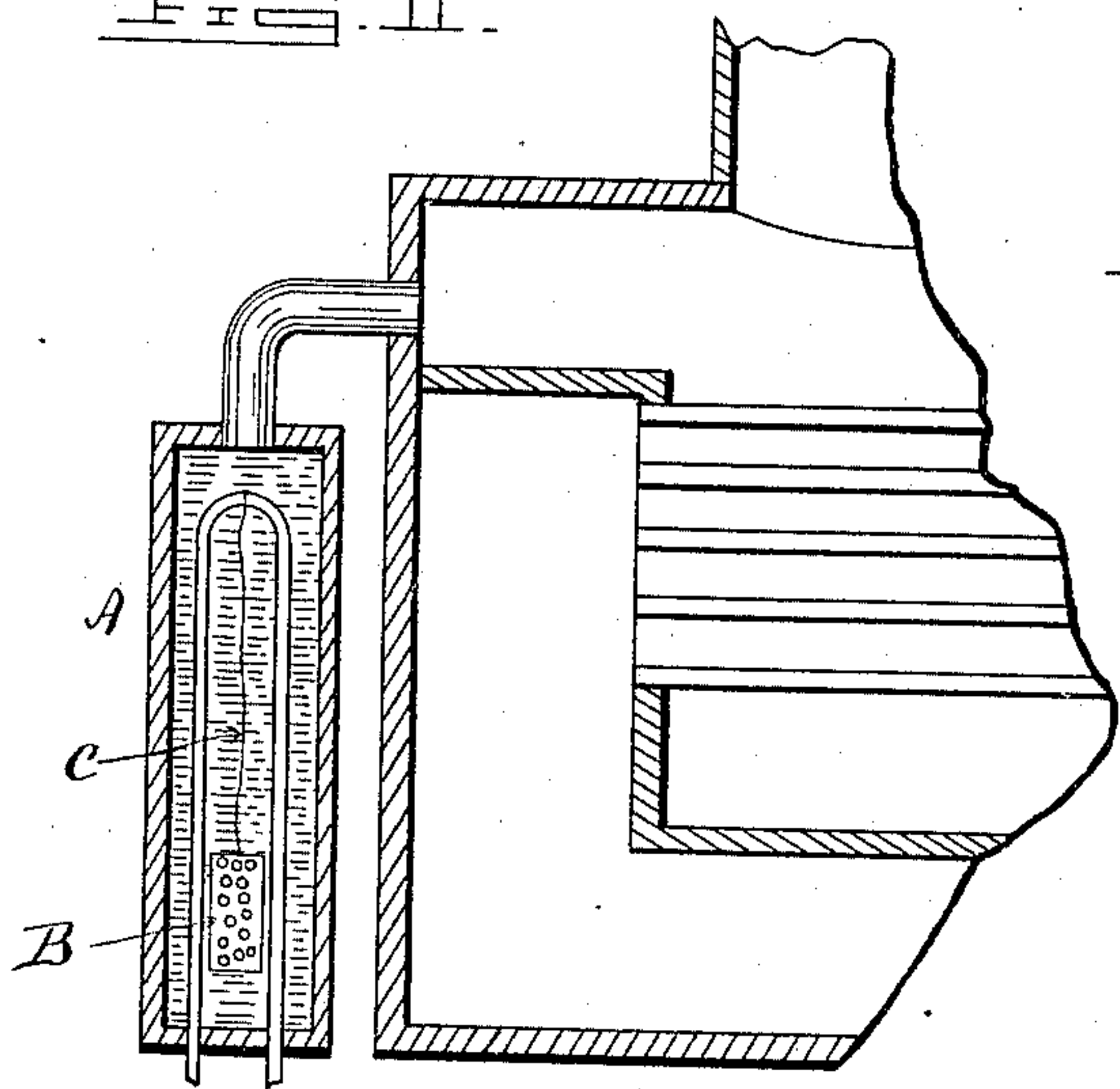
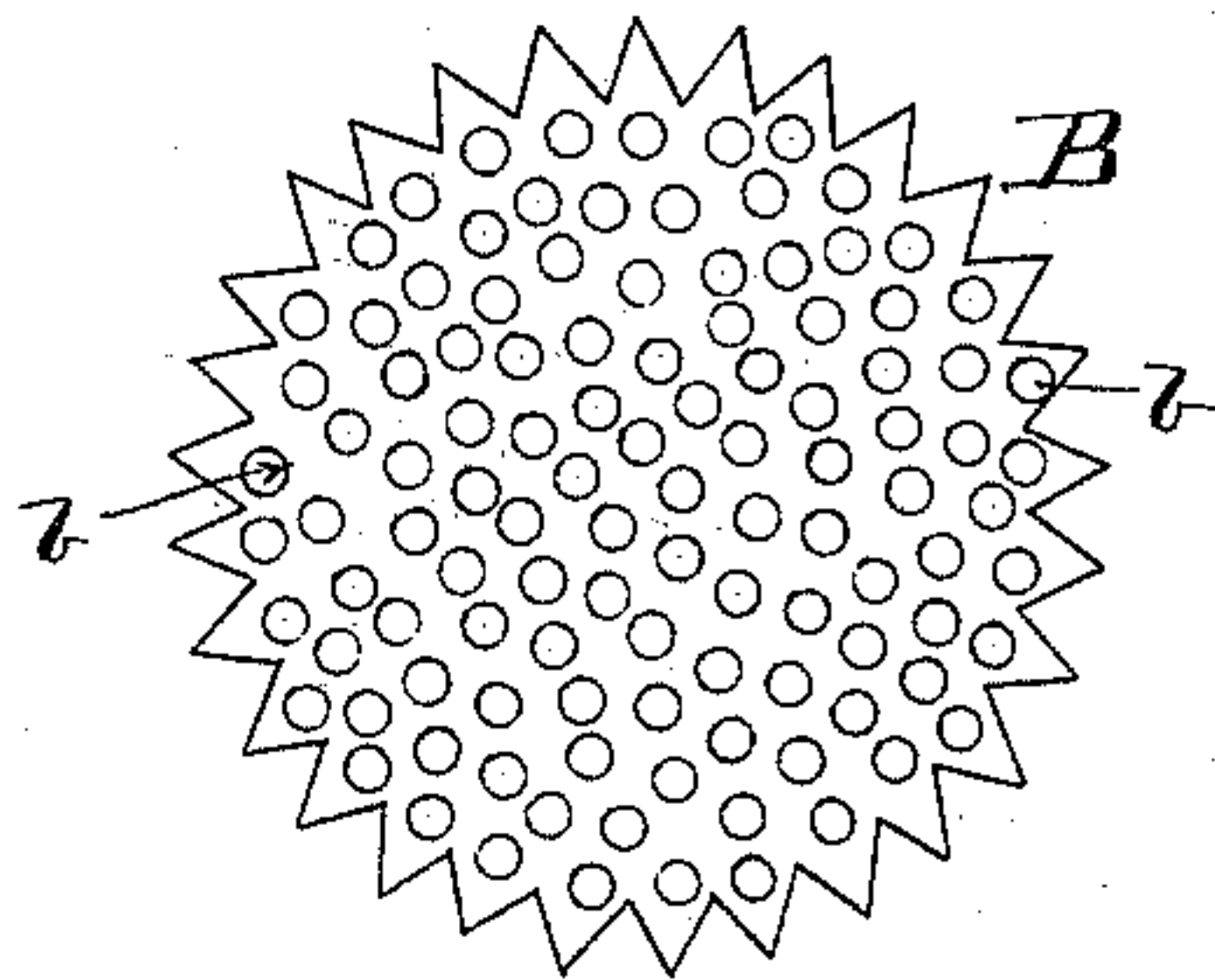


FIG. III.



Witnesses,

Alb. Buhman.  
Chas. S. Kalb.

Inventor,

Francis J. Clamer.

By his Attorney

M. Kalb.



# 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. 387,145, dated July 31, 1888.

Application filed January 31, 1888. Serial No. 262,507. (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 a 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 for patent filed by me on even date herewith, Serial No. 262,506, I have described and claimed zinc as an agent or means for producing these results when suspended in the water in or to be fed into a steam boiler or generator.

I have discovered that a combination of zinc and phosphorus produces effects of a more satisfactory character than those produced by the use of zinc alone; and my present invention consists of a metallic compound to be placed in the water in a steam boiler, generator, or feed-water heater formed of zinc and phosphorus. A piece of such composite metal placed in water in a boiler, generator, or feed-water heater will entirely destroy the scale-producing elements, separate the acids from the alkalies, and entirely prevent the formation of scale in a boiler or generator, and at the same time it will soften and break up any such scale previously formed. I prefer to suspend such composition in the water substantially in the same manner as is described and shown in my application for patent already referred to; but as I believe the composition herein named to be new in itself for the purpose described, I do not limit myself to its being suspended, as it is apparent that good results may be obtained by placing the compound in any position under the water in the boiler, generator, or

heater, whether it is suspended or not. Better effects will, however, be produced by suspending the composition or compound, for the reasons set forth for suspending the zinc in my aforementioned application for patent, and I prefer and recommend it to be suspended. I also prefer to use a conducting-wire or connection for effecting the suspension—as, for instance and by preference, copper wire, as such metal assists the composition of zinc and phosphorus, as this metal assists in the prevention of scale by neutralizing or destroying the hydrogen gases, as will be explained in a third application for patent filed herewith, Serial No. 262,508; but it will be understood that I do not claim nor insist upon the use of copper wire for forming such connection, as it is apparent that a great variety of metals afford sufficient conductivity to answer well in this situation.

The composite metal which I use may be formed into any shape—as, for instance, a plate or mass—which may be perforated, indented, or serrated to increase the exposed effective surface; or it may be broken into pieces or in other form suspended in a basket, bag, or net, (which may also be of copper wire,) and suspended, as named in my application above referred to; or it may simply be thrown into the boiler in any shape or in any part of the boiler, so as to be covered by the water therein; or it may be placed in any manner in a feed-water heater.

I would not be understood as limiting myself to the manner of using or applying this composition, except that it is necessary for it to be submerged in the water of the boiler, generator, or feed-water heater.

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

Figure 1 shows a section of a boiler with the composition suspended and also placed upon the boiler-iron. Fig. 2 shows a feed-water heater applied to a boiler with a piece of the composite metal in it. Fig. 3 is an enlarged face view of a plate of the composite metal formed to increase the exposed area.

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



A is the boiler, generator, or feed-water heater, and B the pieces of composite metal, (zinc and phosphorus.) This composite metal may be made in the form of a plate or mass, as shown at the left hand of Fig. 1 and in Fig. 3, and is preferably perforated, indented, or serrated to increase its exposed or effective area; or it may be in broken pieces suspended in a bag, net, or basket; or it may be deposited on the boiler-iron. When suspended, I prefer to use a conducting metallic connection— as, for instance, copper wire—which will, in the perforated plate form, be laced through the perforations *b*, and in the basket or net will preferably form the basket or net or other receptacle. The benefit of using copper wire has already been referred to. The wire is marked C.

The plate or mass may be serrated, as shown in Fig. 3, or indented or otherwise formed to increase the extent of its exposed surface, as well as perforated. If desired, however, the mass or plate may be left plane.

It will be understood that for suspension in the basket or net and for simply throwing into the boiler, generator, or heater the form of the material is entirely unimportant.

The number of plates or parts B employed in a single boiler will of course be varied with the size of the boiler. In instances where one plate or part is sufficient the use of one only will be found more convenient than a greater number. Where more than one are required, the plates, baskets, &c., will be placed about equidistant from each other by preference.

The composite metal (zinc and phosphorus) suspended in the water of a boiler, generator, or heater creates a galvanic current, which cleanses it from scale-producing elements, separating the acids and alkalies and preventing the formation of scale, and also loosening and dissolving the already-deposited scale, the phosphorus being a deoxidizing metalloid.

I have found that for ordinary water, not impregnated to too great a degree with acids and alkalies, the zinc and phosphorus can be combined in about the following proportions, to wit: sixteen (16) parts of zinc and one (1) part of phosphorus; 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 and phosphorus, substantially as set forth.

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

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

FRANCIS J. CLAMER.

Witnesses:

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