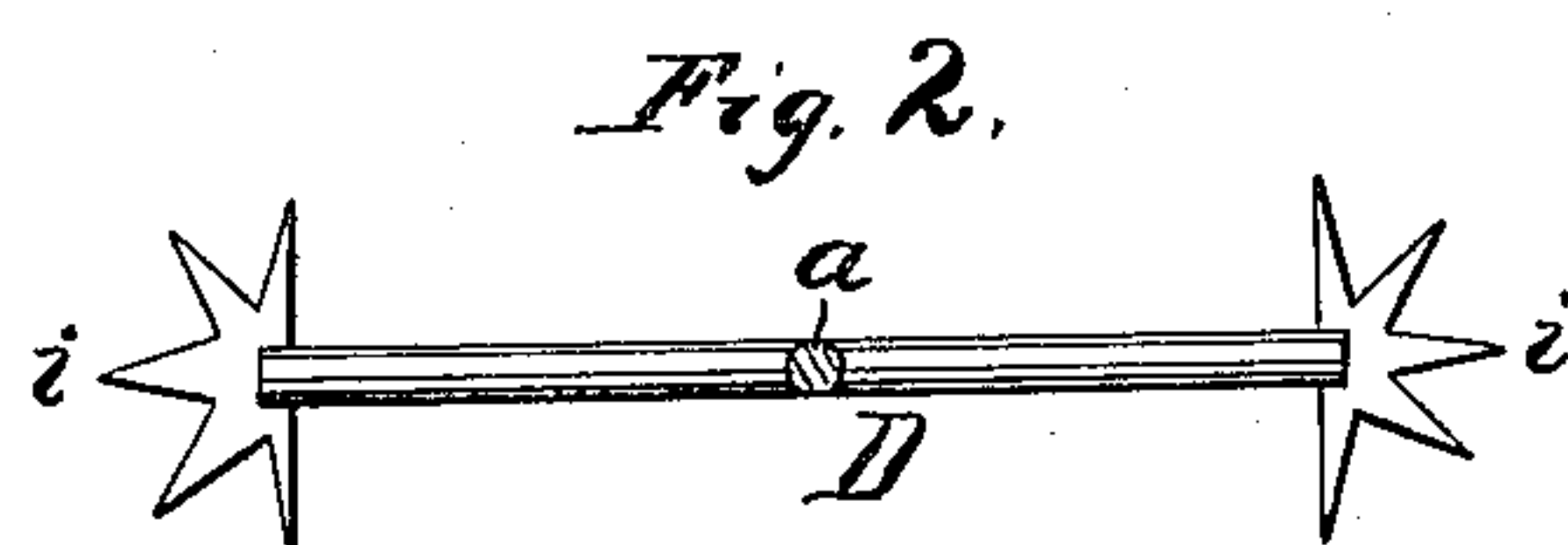
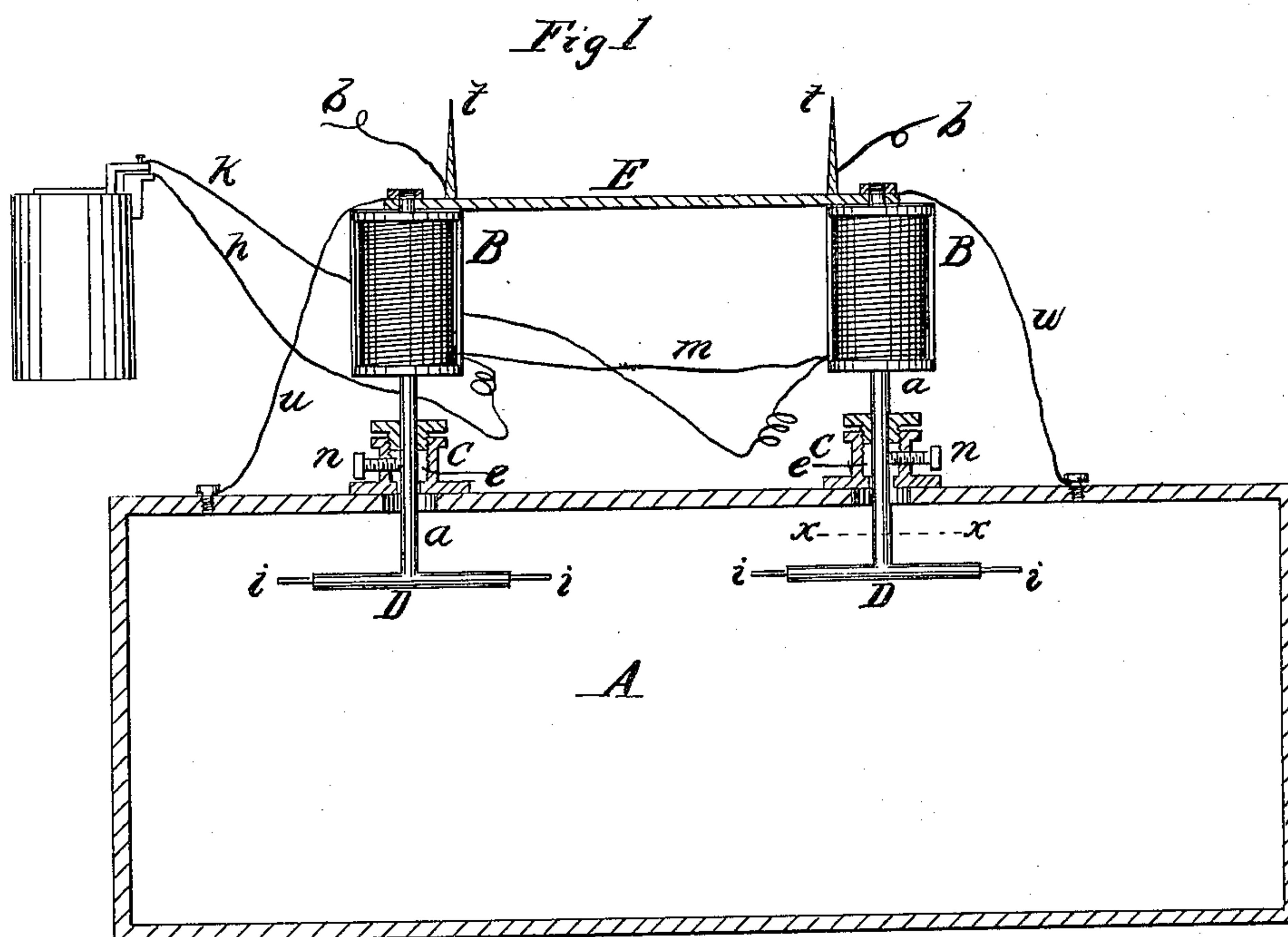


S. G. CABELL.
 PREVENTING INCRUSTATION OF STEAM BOILERS.
 No. 71,451. Patented Nov. 26, 1867.



Witnesses
 P. F. Dodge
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United States Patent Office.

S. G. CABELL, OF QUINCY, ILLINOIS.

Letters Patent No. 71,451, dated November 26, 1867.

IMPROVEMENT IN PREVENTING INCORUSTATION OF STEAM BOILERS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, S. G. CABELL, of Quincy, in the county of Adams, and State of Illinois, have invented certain new and useful improvements in the application of Electrical Devices to Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, and to the letters of reference marked thereon; like letters indicating like parts wherever they occur.

To enable others skilled in the art to construct and use my invention, I will proceed to describe it.

My invention consists in a novel construction and application of magnets to steam-boilers, for the threefold purpose of preventing incrustation, removing scale, and conveying electricity from steam-boilers.

Figure 1 is a longitudinal vertical section of a steam-boiler with my apparatus applied thereto, and

Figure 2 is a view of portion detached.

As it is known that the introduction of magnets into boilers prevents the deposit of the usual incrustation therein, and that the application of an electro-magnet to a boiler has the effect of loosening and removing the scale or incrustation therefrom, I will proceed at once to describe my improved apparatus used for these purposes, and which constitutes my invention in the present case.

A represents a boiler, upon which I secure one or more stuffing-boxes, C, directly over holes made in the shell of the boiler, as shown in fig. 1. I provide a couple of electro-magnets, B, consisting of a coil of insulated wire wound upon a core, and preferably enclosed by an outer metallic case, as shown. The core *a* of these magnets I make much longer than the helix, and extend it down through the stuffing-box C into the boiler, where it has attached to its lower end a transverse metallic rod or bar, D, terminating at each end in a series of points, *i*; the rod D being represented detached in fig. 2. When the core *a* passes through the stuffing-box C, it is surrounded by gutta percha or other insulating material, as represented by *e*, in fig. 1. In the side of the stuffing-box C I insert a screw, *n*, so arranged that it may be screwed in or out, and thus connect the core *a*, and consequently the magnet, with the outer portion of the stuffing-box, and thereby with the shell of the boiler A at will, or by removing the screw from contact with the core *a* the magnet may be left insulated from the boiler when desired; or, in lieu of the screws *n*, a wire, *u*, may be connected with the outer end of the electro-magnet B, and have its other end connected to the exterior of the shell, as represented in fig. 1, for accomplishing these results. The core *a* and its rod D may be made of soft iron, as usual in electro-magnets, or they may be made of steel, in which case they will become permanent magnets when once charged; or, if preferred, the core *a* may be made of soft iron and the rod D of steel, in which case the latter only will become a permanent magnet. By these means I am enabled to have a permanent magnet at all times within the boiler, and may have it either connected therewith or insulated therefrom at will to prevent incrustation. If it be desired to remove the scale, the electro-magnets B may be connected to a battery, as shown, by connecting the wires *m*, and attaching their opposite ends *k* and *h* to the opposite poles of the battery. By turning the screws *n* in, the magnets will be connected with the shell of the boiler, by which means the scale will be loosened or removed. By turning the screws *n* so as to break the connection with the boiler, the battery may be used in connection with the permanent magnets D, or with the rods D, in case the latter are not permanent magnets, and thus have the application of the effective force within the boiler, while the coils themselves are located outside of the boiler and entirely insulated therefrom, and without the use of any steam-dome or chamber, as in my former application. For the purpose of conveying away from the boiler any surplus electricity that may exist therein from any cause, I provide the electro-magnet B with the points *t*, to which wires *l* may be attached, and lead from thence to the ground, or have ground connection in any suitable manner.

By this construction and arrangement of the devices I am enabled to apply either permanent or electro-magnets, or both together, to steam-boilers, in a most simple and efficient manner, and at the same time have them so arranged that they may be connected to or disconnected from the shell of the boiler at will, and at the same time have the electro-magnets located outside of the boilers, where they can be got at at any time, without inconvenience.

Having thus described my invention, what I claim, is—

1. The combination with a steam-boiler of an electro-magnet, applied externally, and having its core extending within the boiler and insulated therefrom, substantially as described.

2. In combination with an electro-magnet constructed and applied to a boiler as described, I claim the use of the screws *n* or wires *u* for making or breaking connection with the boiler-shell at will, as set forth.

3. In combination with an electro-magnet applied externally, I claim the use of a permanent magnet applied internally to the boiler, as herein described.

Witnesses:

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