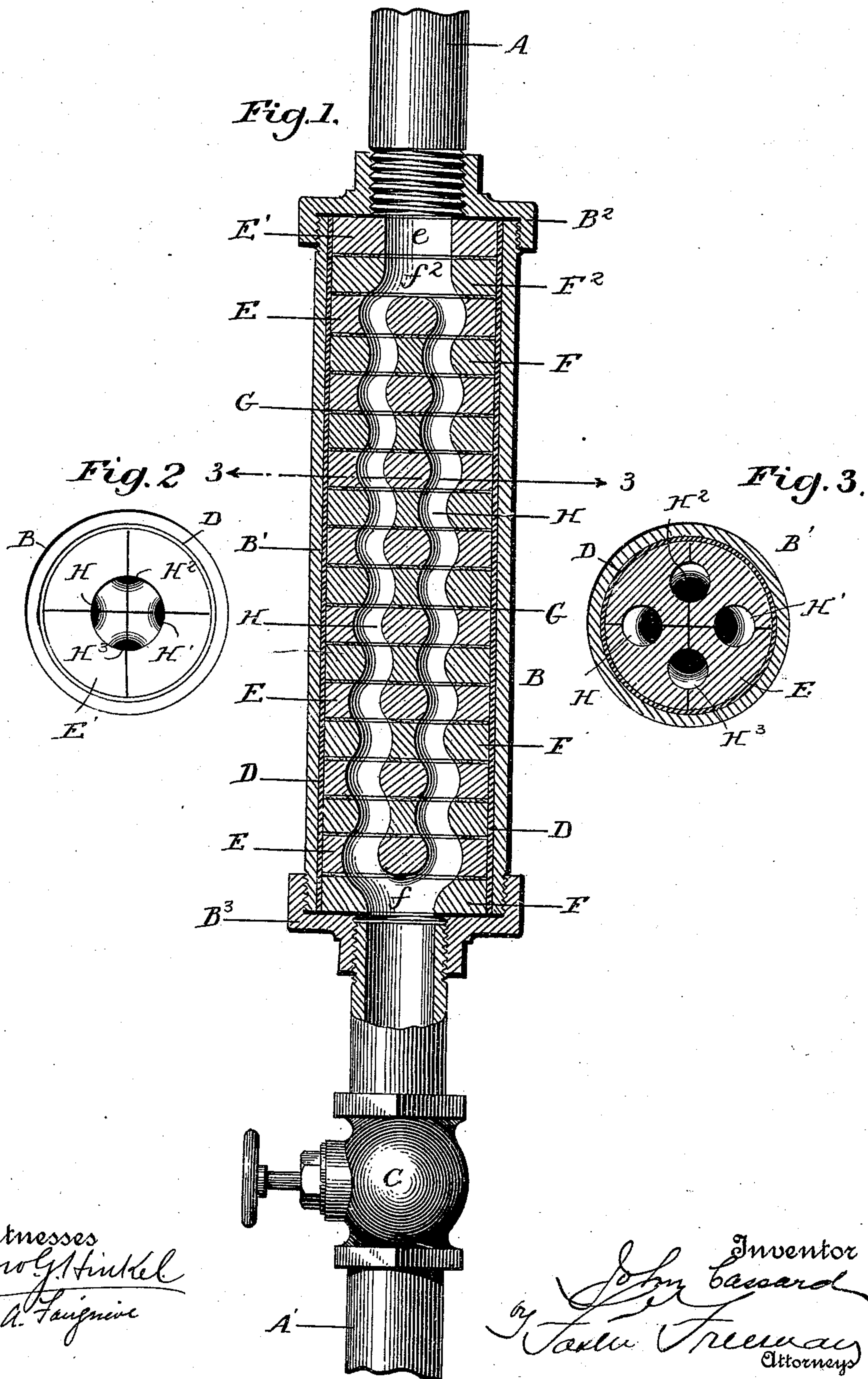


(No Model.)

J. CASSARD.
WATER PURIFIER.

No. 547,710.

Patented Oct. 8, 1895.



UNITED STATES PATENT OFFICE.

JOHN CASSARD, OF BALTIMORE, MARYLAND, ASSIGNOR OF TWO-THIRDS TO
TOUGH, RUTHERFORD & CO., OF SAME PLACE.

WATER-PURIFIER.

SPECIFICATION forming part of Letters Patent No. 547,710, dated October 8, 1895.

Application filed June 20, 1895. Serial No. 553,454. (No model.)

To all whom it may concern:

Be it known that I, JOHN CASSARD, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Water-Purifiers, of which the following is a specification.

My invention relates to that class of water-purifiers in which the water is passed through a purifier comprising materials which are electropositive and electronegative with relation to each other and in which passage the water is purified and may be used for a variety of purposes, and more particularly in connection with steam-boilers and the like.

The object of my invention is to provide an exceedingly simple, cheap, and effectual means of the class described whereby the water in passing through the purifier is subjected to the galvanic action arising from the elements of which it is composed and is thereby prevented from forming scales in the boilers, the mud and solid matter are prevented from congealing, and as a consequence the water used for generating steam does not act deleteriously upon the flues or boiler or other device, and pitting, galvanizing, and carbonizing and other deleterious actions are prevented.

To these ends my invention consists in a water-purifier embodying the features of construction and arrangement of parts, substantially as hereinafter more particularly pointed out.

Referring to the accompanying drawings, Figure 1 is a longitudinal vertical section of a purifier embodying my invention. Fig. 2 is an end view with the cap removed; and Fig. 3 is a transverse section on the line 3 3, Fig. 1.

It is a well-known fact that water may be purified by passing it through a purifier in which the elements of a voltaic pile or metals which are relatively electropositive and electronegative to each other are combined, and this is especially true in purifying feed-water for boilers, and numerous devices have been suggested for accomplishing this result, some of which are more or less complex and expensive and open to various objections, and it is one of the main objects of my present invention to provide an exceedingly simple,

cheap, and effective means to accomplish this result. One of the essential features of this class of devices is to have the water pass in contact with as many plates, disks, or elements of the galvanic couple as possible in the least possible space, and another feature is to have the water under pressure as it passes through these parts, so as to cause more or less friction between the water and the galvanic couples, and these features are accomplished to a satisfactory extent in my device, which I will now describe. It is desirable to provide a device which can be readily attached or interposed between the source of supply for the water and the boiler or other device in which the water is utilized, and I have shown a pipe A, representing a feed-pipe or source of supply, and a pipe A', adapted to be connected to the boiler or other device in which the water is used, and interposed between these two pipes is my purifier B, there being a cock C, by which the flow of the water can be controlled in the usual manner.

The purifier consists, essentially, of a casing B', which is shown in the form of a cylindrical metallic tube, but which may be of any desired shape or configuration and of any material, and it is provided at each end with a metallic cap B² B³, which is adapted to be secured to the cylinder by screw-threads or otherwise and to form a connection with the pipes A A'. Arranged and fitting inside of the cylinder B' is a sheating D, which is preferably made of insulating material, as hard rubber, although it may be made of lead or other suitable material, and which serves to inclose the galvanic elements hereinafter described and to prevent their contact with the casing of the purifier.

The body of my purifier consists, essentially, of alternate plates or disks E F, the plates E, for instance, being of copper and the plates F being of zinc or of some other relatively electropositive and electronegative materials, and these plates are superposed one upon the other, and interposed between the alternate plates is a washer or gasket G, and these gaskets are preferably composed of woolen cloth and sheets of asbestos pressed tightly together, and I have found

gaskets thus made are exceedingly durable and aid in increasing the galvanic action of the device.

As above intimated, one of the objects of my invention is to provide means whereby the water may be caused to pass through the purifier under force or pressure and to be in contact with a large portion of the surfaces of the galvanic elements, and in order to accomplish this I arrange the parts so that the water flows therethrough in several different streams, there being four separate passages provided in the present instance, although, of course, there may be three, five, or any other desired number, it being desirable, however, that the aggregate cross-section of all of these passages shall be practically equal to the cross-section of the inlet and outlet passages to the body portion of the purifier. Furthermore, these passages are shown in the shape of corrugations or serpentine or sinuous passages, so that the water in passing through will come in contact with more surface and be deflected from side to side, so that it will cause more or less friction and induce more thorough purification of the water. Various ways of constructing these passages may be utilized to accomplish the results desired, and I have shown the preferred way, which is exceedingly simple, and it will be seen that the end plates or disks $E' F'$, which are respectively electropositive and electro-negative to each other, have a single central opening $e f$, which is about the size of the openings in the pipes $A A'$. In this arrangement the second disk or plate F^2 is shown as having a diverging opening f^2 —that is, its upper surface corresponds to the opening e in the disk or plate E' and diverges into four openings, forming the sinuous or corrugated passages $H H' H^2 H^3$. The remaining disks or plates in the present instance are provided with four openings, as best shown in Fig. 3, constituting the sinuous or corrugated passages $H H' H^2 H^3$, and they are so arranged that when the plates are put together there are four, more or less, continuous passages connecting the end plates, through which passages the fluid flows in contact with the galvanic elements and becomes purified in the manner well understood. These plates E and F may be made in single pieces, or, as a detail of construction, they may be made in sectors, as indicated in Figs. 2 and 3, and the sectors put together and held in position by the casing or otherwise. It is preferable that the electropositive elements, for instance, shall form one portion of the curve and the electronegative elements another portion of the curve or sinuous passage, so that any number of plates may be put together in alternate arrangement, and a purifier of any desired length or size may thus be built up.

It will be seen that by my construction not only is the device very simple, but it may be made of any length, size, or capacity, and of course the number and size of the passages may vary to suit the requirements of any particular case. No special adjusting means are necessary, as the plates can be placed alternately in the casing and the caps secured thereto, and these caps will hold the plates together with sufficient closeness to prevent any leakage or otherwise. The purifier can be readily attached to or detached from the feed-water supply of a boiler or other device and occupies little room and has been found to supply the requirements of such a device in a most satisfactory manner.

While I have thus shown and specifically described the preferred embodiment of my invention, it is evident that the details of construction can be varied in the manner indicated or any equivalent ways without departing from the spirit of my invention.

What I claim is—

1. A water purifier comprising a number of electro-positive electro-negative plates alternately arranged with relation to each other and provided with a series of sinuous passages through the alternately arranged plates, substantially as described.

2. A water purifier comprising a series of alternately arranged electro-positive electro-negative plates, a casing inclosing the plates, an opening at the end for the passage of water, and a series of openings through the body of the plates, the aggregate area of said series of openings being substantially the same as the area of the end openings, whereby the water is under pressure and in frictional contact with the openings, substantially as described.

3. In a water purifier, the combination with the casing, of the end caps connected thereto, and the alternately arranged electro-positive electro-negative plates, the end plates having openings corresponding to the openings in the caps, and the intermediate plates being provided with a series of openings the aggregate area of which is practically the same as the area of the openings in the end plates, substantially as described.

4. In a water purifier, the combination with the casing, of the end caps secured thereto, the sheathing, and the alternately arranged electro-positive electro-negative plates each composed of sectors and having openings, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN CASSARD.

Witnesses:

JNO. A. BARKER,
WM. H. JONES.