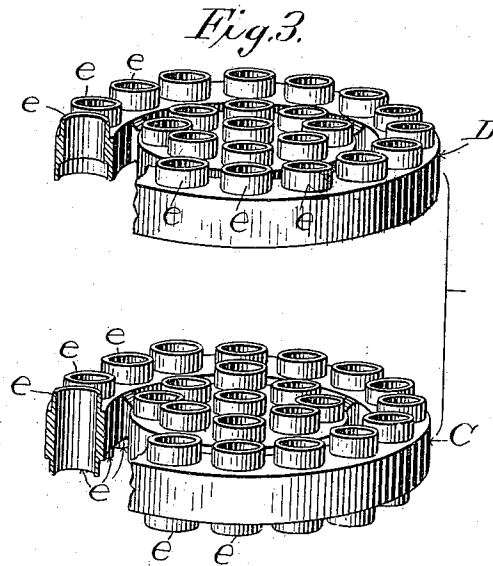
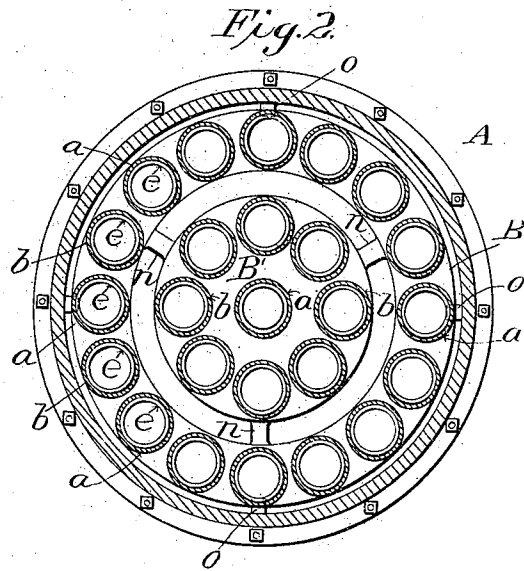
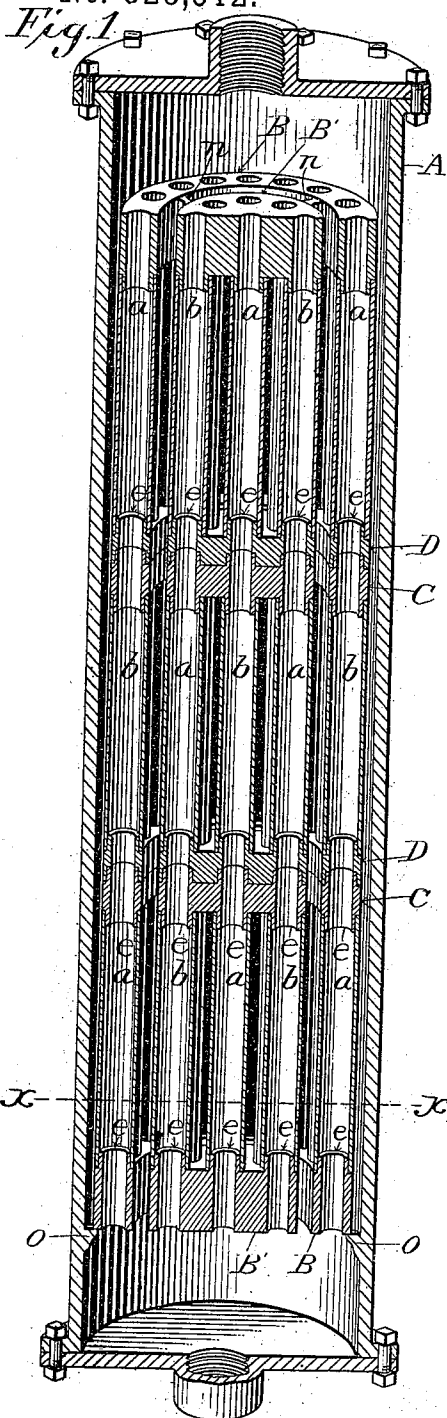


(No Model.)

S. L. BAILEY.
FEED WATER PURIFIER.

No. 528,512.

Patented Oct. 30, 1894.



WITNESSES

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UNITED STATES PATENT OFFICE.

STERLING L. BAILEY, OF CHICAGO, ILLINOIS.

FEED-WATER PURIFIER.

SPECIFICATION forming part of Letters Patent No. 528,512, dated October 30, 1894.

Application filed July 9, 1894. Serial No. 516,966. (No model.)

To all whom it may concern:

Be it known that I, STERLING L. BAILEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Feed-Water Purifiers, of which the following is a specification.

My invention relates to feed water purifiers for use with boilers, and the invention consists in a novel construction of the apparatus, whereby it is rendered more effective and capable of being more readily taken apart for cleaning or repair, all as hereinafter described.

Figure 1 is a sectional perspective view of the apparatus ready for use. Fig. 2 is a horizontal section on the line $x-x$ of Fig. 1, looking from above downward; and Fig. 3, a perspective view of adjoining tube-heads, partly in section.

Various forms of apparatus have heretofore been designed for purifying the feed water of boilers by galvanic action, but as hitherto constructed it has been found difficult to remove the parts when necessary for the purpose of cleaning out the apparatus, and in them also the metallic surfaces which produce the galvanic action are too small to produce the best results, unless the apparatus be made of an unnecessarily large size.

The object of my invention is to remedy these objections or difficulties, and to produce an apparatus which shall be small and compact, and yet have sufficient surface of the requisite metals to act with efficiency upon the water, and the internal parts of which can be removed and replaced without difficulty whenever required, either for cleaning or for renewal of the parts.

In the drawings A represents the case, which may be of cast iron, with heads bolted on as shown, the heads being tapped for the reception of an inlet and an outlet pipe, as represented in Fig. 1. On the inner walls of this case I provide lugs o , three or more, to support the internal parts, these lugs being cast with the case or secured thereto in any suitable manner. Within this case I arrange a series of zinc and copper pipes a and b in two or more circles (according to the diameter of the case) as indicated in Fig. 2, there

being as many of these tubes as can be arranged within the case and allow free space for the water to pass between and through them. These tubes are held in place by means of zinc plates at top and bottom, the bottom plates B and B' being shown clearly in Fig. 2. If these bottom plates be cast separate, there will be arms or projections n cast on one or the other as shown in Fig. 2, in order to hold them and the two rows of tubes concentric. It is, however, obvious that they may be cast together as one plate, the inner and outer portions being connected by the arms n . On their upper faces around each tube hole, is an annular projection or collar e , of the proper size to permit the tubes a and b to fit over them as represented in Figs. 1 and 2. At their upper ends these tubes, if made continuous and of full length, as they obviously may be, are held by a similar zinc plate or plates, reversed so as to have the collars e on the under side for receiving the upper ends of the tubes, all or a portion of the tubes being soldered at their ends to the plates so as to hold the parts together and enable the tubes with their plates to be handled with ease and without separating.

The tubes are alternately of zinc and of copper, or of other metals that are relatively electro positive and negative, a indicating the zinc tubes and b the copper tubes. Thus far I have described these tubes as being continuous from end to end, but I prefer to make them up in sections, three sections being shown in Fig. 1, each section ordinarily being six or more inches in length, and the tubes a half inch or more in diameter. When thus made up in sections, the upper ends of the lower group of tubes are held in place by a zinc plate C, Fig. 1, which has the projecting collars e on both faces, those on the lower face to receive the upper ends of the tubes, and the collars on the upper face serving to fit into circular recesses in the bottom plate D of the group above, as shown in Fig. 1, the second and third groups being united in the same way. One advantage of making them in sections is that the tubes can be so arranged that the copper tubes in one group can be made to coincide axially with the zinc tubes of the next group, and so on continu-

ously with all the groups, so that the water passing from bottom to top passes first through a tube of one metal in one group, then through a tube of the other metal in the next group, and then through a tube of the same metal as in the first group, as shown in Fig. 1, where, as previously stated, *a* indicates the zinc and *b* the copper tubes. Of course the same effect is produced upon the outer surface of the tubes at the same time, inasmuch as the tubes resting on the brackets *c* have a space between the tubes and the inclosing case, through which the water has free circulation, passing thence among and around all the tubes. By this construction and arrangement, and owing to the large amount of surface of the zinc and copper brought into contact with the water, the galvanic action is greatly increased, and thus a very effective apparatus can be produced of small size.

When necessary to clean the purifier, or to renew any of the parts, it is only necessary to remove the top plate and lift the sections out successively. Being separated from the case, corrosion and sediment do not interfere with their removal as with apparatus now in use.

To replace the parts it is only necessary to set the first or bottom section on the supports *c*, then place the second on that, and the third on the second, they fitting together as described, so that they are held securely in place without other contact with the case than where the lower section rests upon the lugs or brackets.

It is obvious that this construction is applicable to all sizes required, and that if desired, the number or the length of the sections may be increased.

Copper and zinc are named as the preferred metals because of their efficient action and their cheapness, but it is obvious that other relatively electro-positive and negative metals may be used, such as zinc and lead,—zinc and iron,—zinc and tin,—iron and copper, or other well known couples. So too, I have described the heads as formed with nipples, or with nipples and sockets, but it is obvious that sockets alone may be provided and the ends of the tubes be inserted directly therein. Finally, it is not essential that the heads B, B', C and D be made of zinc, as other metals will answer, but I prefer zinc because of its superior action with the copper tubes.

Having thus described my invention, what I claim is—

1. In a water purifier, the combination of an outer shell provided with a removable cap, and a series of relatively electro-positive and negative tubes loosely mounted within the shell and freely removable therefrom.

2. In a water purifier, the combination with an outer shell, of a removable interior body composed of tubes of relatively electro-positive and negative metals, and connecting heads therefor,—and supports for said body within the shell.

3. In a water purifier, the combination with an outer containing shell, of an internal tubular body, composed of separable sections each comprising a group of tubes of relatively electro-positive and negative metals.

4. The herein described water purifier, consisting of an outer shell A provided with internal lugs or projections *c*, and a removable internal tube system comprising tubes *a* and *b* of relatively electro-positive and negative metals, connected by heads B.

5. In combination with shell A, a sectional internal tube system, consisting of tubes *a* and *b* of relatively electro-positive and negative metals, arranged in groups, each group being provided with connecting heads, the lower head of one group being adapted to fit upon the upper head of the next lower group, substantially as shown and described.

6. In a water purifier, the combination of a shell A, and a sectional tube system of relatively electro-positive and electro-negative metals contained therein, the tubes being arranged in groups, and the groups being provided at their proximate ends with heads C and D, respectively furnished with nipples and sockets in axial alignment with the tubes, whereby the groups are held in proper relation.

7. In a water purifier, the combination with an outer shell, of an internal tube system of relatively electro-positive and negative metals, said tube system being provided with heads having annular openings, and being of less diameter than the shell, whereby free passage for the water is afforded between the shell and heads and through the heads.

In witness whereof I hereunto set my hand in the presence of two witnesses.

STERLING L. BAILEY.

Witnesses:

FRED M. BAILEY,

AL. J. RODGERS.