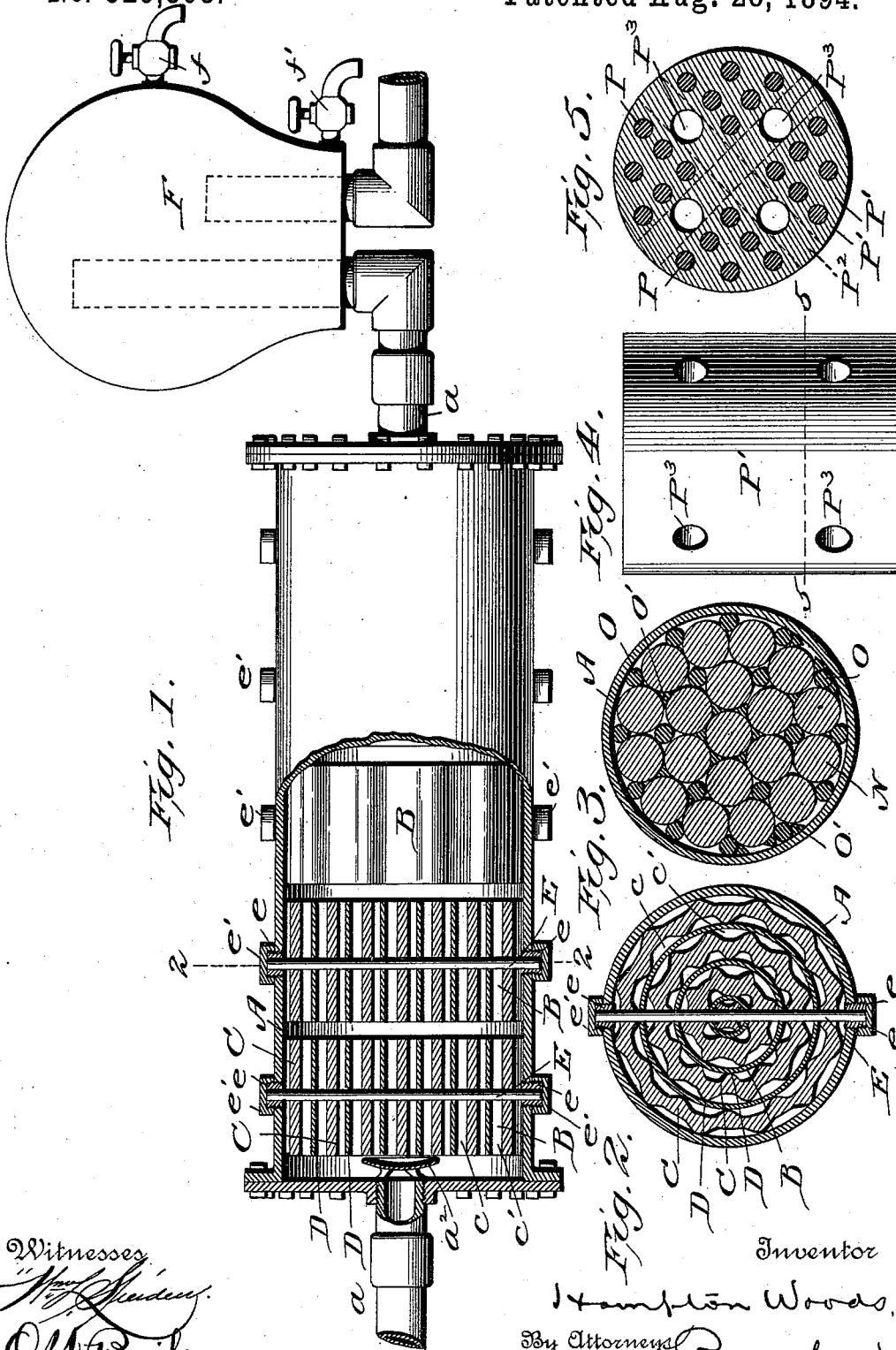


(No Model.)

H. WOODS.  
WATER PURIFIER.

No. 525,303.

Patented Aug. 28, 1894.



Witnesses  
*Wm. H. Bailey*  
*Chas. H. Bailey*

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# UNITED STATES PATENT OFFICE.

HAMPTON WOODS, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO  
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## WATER-PURIFIER.

SPECIFICATION forming part of Letters Patent No. 525,303, dated August 28, 1894.

Application filed September 15, 1893. Serial No. 485,593. (No model.)

*To all whom it may concern:*

Be it known that I, HAMPTON WOODS, 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 Water-Purifiers; and I do hereby 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 letters of reference marked thereon, which form a part of this specification.

The object of the present invention is to produce a novel and simple electric purifier for feed-water for steam boilers, and the invention consists, primarily, of an improved purifier employing a voltaic pile, in which water flows through the pile in channels formed between elements thereof, that is in lines parallel to the elements, in contradistinction to purifiers in which the flow of water through the pile has been transverse to the plates of the pile.

The structural features of a purifier embodying my invention will be fully described and the novel elements will then be pointed out in the claims.

In the accompanying drawings Figure 1 is a longitudinal sectional view of a purifier for feed-water for boilers built according to the present invention. Fig. 2 is a transverse sectional view of the same taken on the line  $xx$ . Fig. 3 illustrates a modification of the same and Figs. 4 and 5 a modified form of rod construction.

A is a cylindrical shell, preferably of copper, having the inlet pipe  $a$  and the outlet pipe  $a'$ , the latter leading to the boiler. At the entrance end of the cylinder there is a deflector plate,  $a^2$ , in the path of the inflowing current, to divert and spread the same and check the flow of the water directly through the center line of the purifier.

The voltaic piles, B, are in the present case shown in five sections, though it may be a single pile extending from end to end of the gland; but the subdivision of the pile into sections gives an increase of efficiency as is well understood. Each pile section consists of a set of alternate concentric rings of zinc, C, and copper, D, or other equivalent ele-

ments. The copper rings are simple cylindrical tubes, while the zinc rings, C, are made with channels or grooves on their inner and outer cylindrical faces, either or both, giving a zig-zag contour to the rings as clearly illustrated in Fig. 2. When the rings are assembled it will thus be seen that longitudinal water channels,  $c c'$ , are left through the pile parallel with the elements of the pile. When the rings forming a pile are assembled, a hole is bored diametrically through the same, and a binding rod E, of insulating material is passed through the hole and the ends of the rod are seated in seats or collars  $e$  provided therefor in the shell A. Screw caps  $e'$  cover these openings in the shell.

In the preferred construction of the purifier the outer case is made of copper, as before stated, so that it in itself constitutes the outer ring of each pile, and also serves to couple together the several piles of the series.

In the outflowing pipe beyond the purifier there is shown a catch basin, F, having a discharge cock  $f$  near the top of the chamber through which any floating matter can be drawn off, and also a cock,  $f'$ , at the bottom for the discharge of sediment settling in the tank.

A simple form of voltaic pile, embodying the feature of numerous channels for the passage of water therethrough on lines parallel with the elements of the pile, is illustrated in Fig. 3; the same consisting of a bundle of rods of zinc and copper or equivalent elements. The zinc rods or bars, N, are relatively large in cross section, and the copper bars or rods O, are relatively small, the latter being inserted in the interstices between the larger rods of zinc. The zinc rods are laid in concentric lines and the copper rods in the interstices between the zinc rods also assume a concentric arrangement. These copper rods may be given a triangular or other irregular form as indicated at  $O'$  so as to substantially fill the triangular space formed by three abutting zinc rods. The rods may be hollow and for example may be formed by folding a strip or plate into a triangular or angular form.

In Figs. 4 and 5 there is illustrated a compound zinc and copper rod adapted to be used in lieu of the rods of the voltaic pile last described the feature of this device being the

embodiment in one piece of the two elements so that each rod or piece, whatever form it may take, is a complete cell in itself, and which for convenience of designation may be called a unit pile, and the multiplication of these simply adds to the number of cells and increases the capacity of the pile. The rods consist of numerous copper wires P, with zinc P' cast around them; and, extending longitudinally and transversely, either or both, through the cylinder there are passages, P<sup>2</sup> P<sup>3</sup> to allow the water to have free entrance into the mass. In this form or embodiment of my invention, the galvanic action will attack the zinc adjacent to the ends of the copper-rods and will gradually work in along the lines of contact between the zinc and the copper, until finally the body becomes honeycombed.

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

1. In a water-purifier, a voltaic pile having the plates or members of the pile in contact

with each other and set parallel with the course of the water, and passages for the flow of the water therethrough, the walls thereof being formed by each series of said members or plates, substantially as specified.

2. In a water-purifier, the combination, with the shell or casing, of a voltaic pile having its elements arranged in concentric lines, with their intermediate channels or passages constituting series of cells therebetween, substantially as set forth.

3. In a water purifier the combination with the shell or casing, of a voltaic pile filling the same in cross section, said pile having its elements arranged in concentric lines with channels therebetween for the flow of water, substantially as set forth.

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

HAMPTON WOODS.

Witnesses:

STORY B. LADD,  
L. C. STRIDER.