

(No Model.)

2 Sheets—Sheet 1.

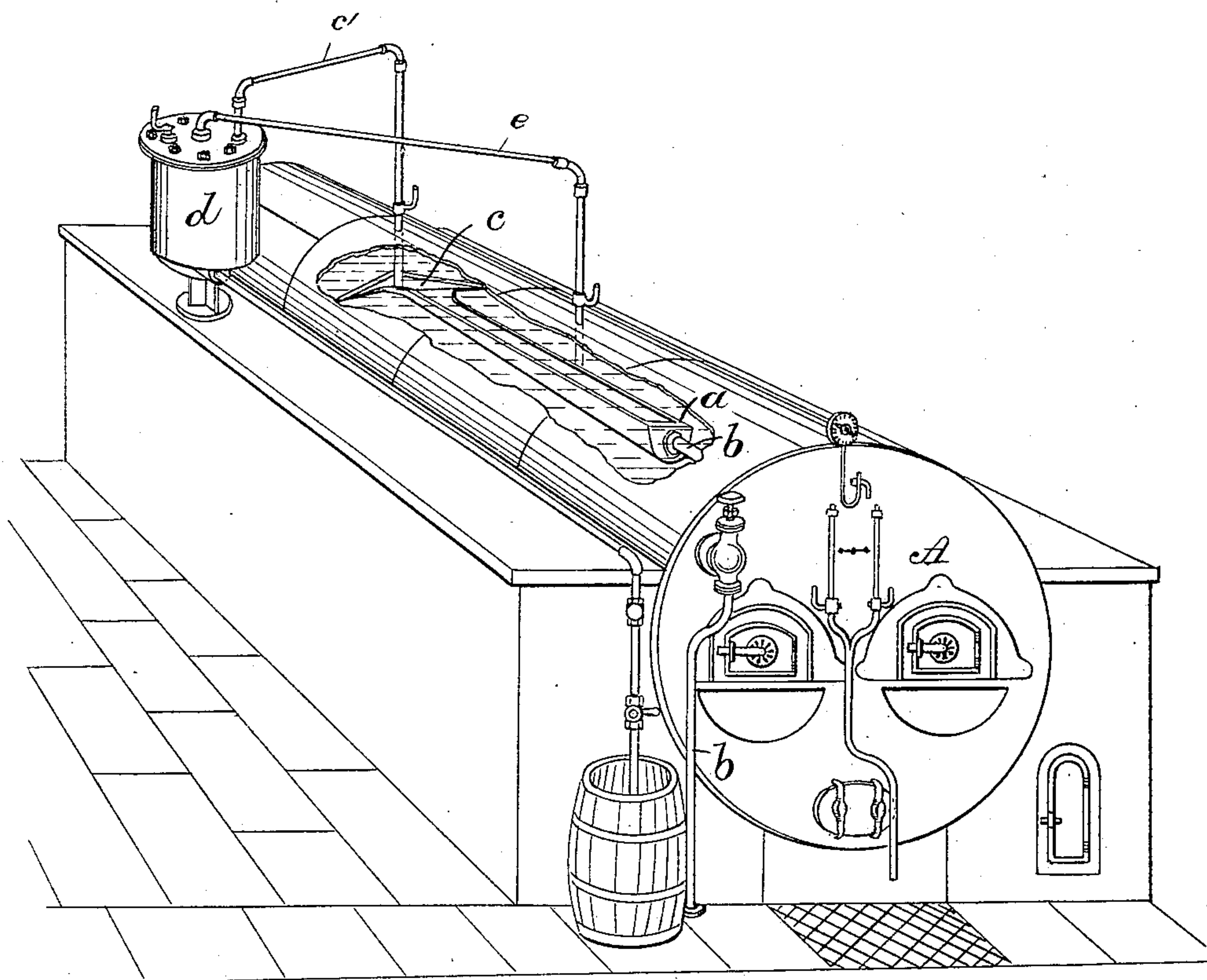
G. W. ALLEN & H. J. A. BOWERS.

FEED WATER PURIFIER.

No. 379,671.

Patented Mar. 20, 1888.

FIG. 1.



Witnesses:

*Wm. Twitchell,*  
*C. Sedgwick*

Inventor:

*G. W. Allen,*  
*H. J. A. Bowers*  
By *Munn & Co.*  
*Attorneys.*

(No Model.)

2 Sheets—Sheet 2.

G. W. ALLEN & H. J. A. BOWERS.

FEED WATER PURIFIER.

No. 379,671.

Patented Mar. 20, 1888.

FIG. 2.

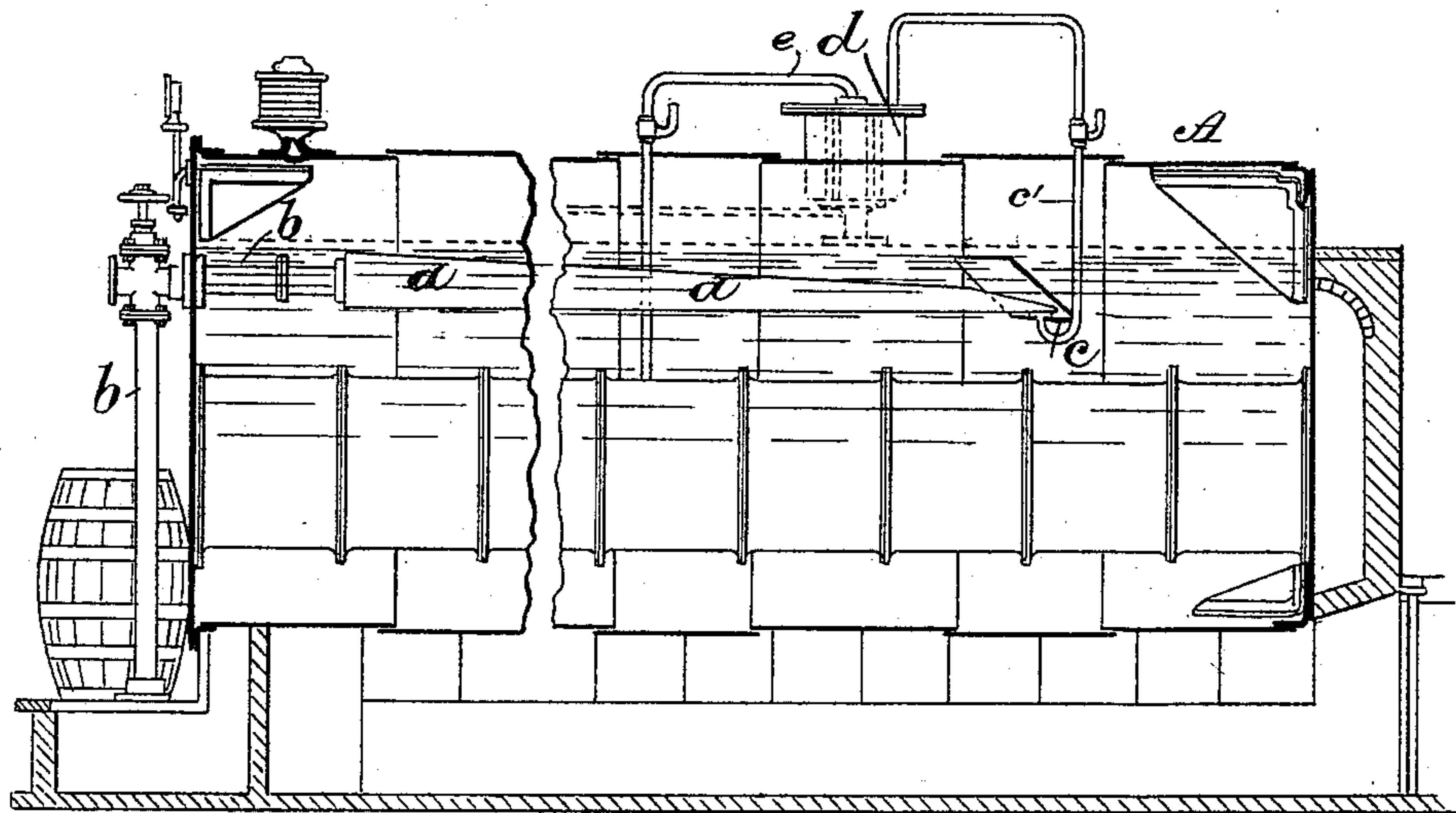


FIG. 3.

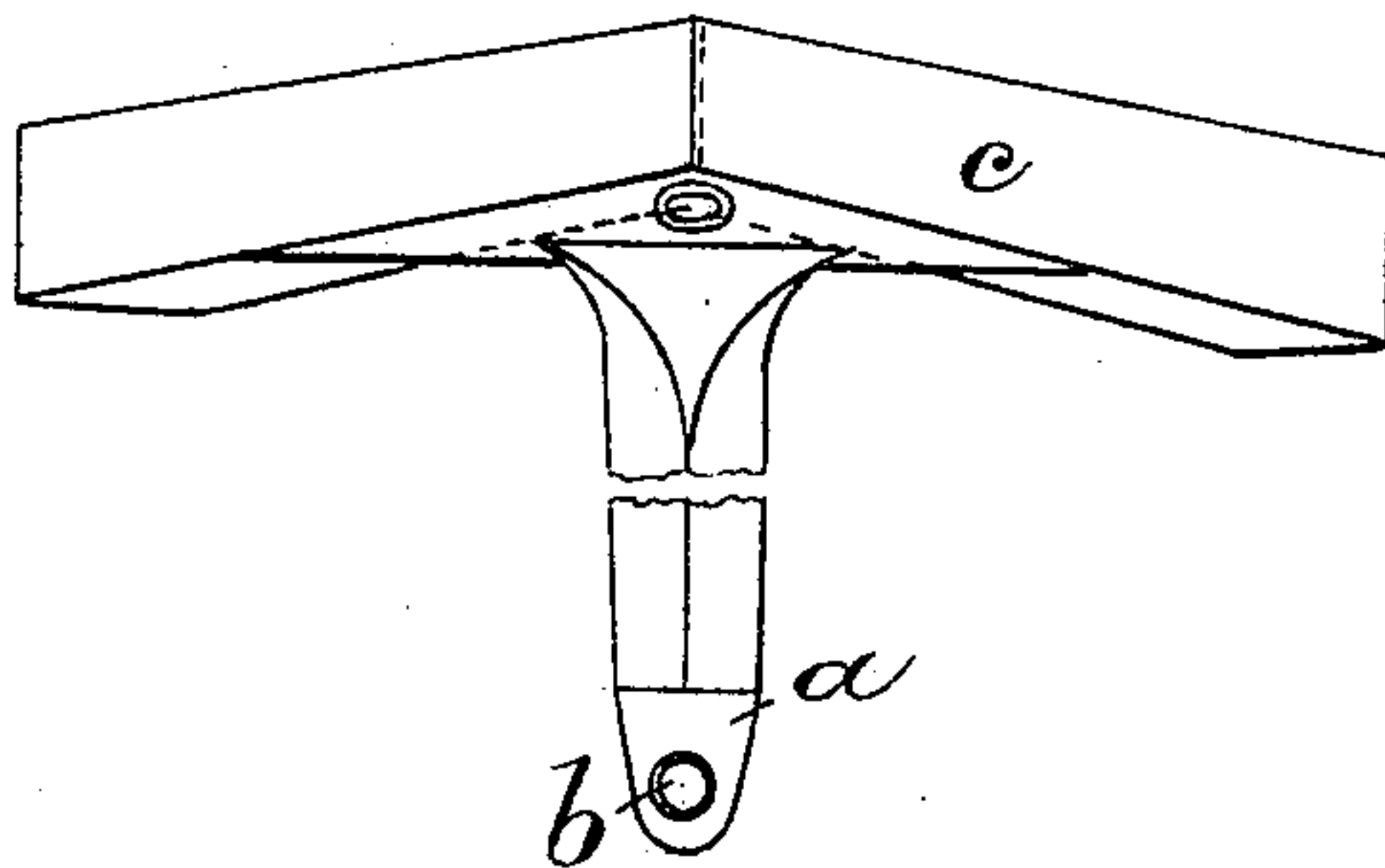
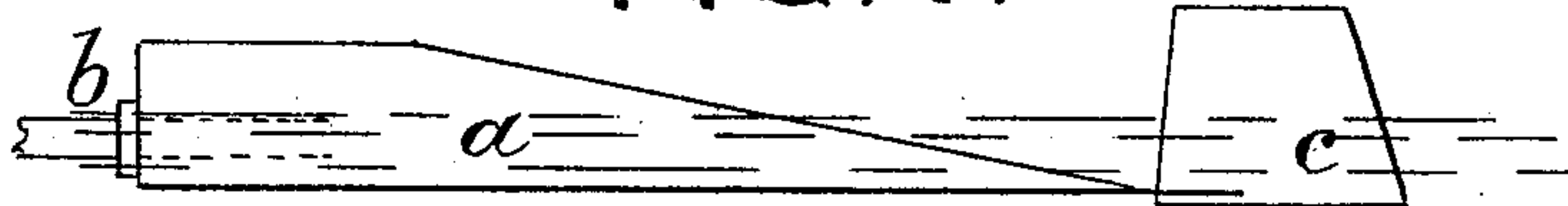


FIG. 4.



Witnesses:

*Wm. Twitchell.*  
*C. Sedgwick*

Inventor:

*G. W. Allen.*  
*H. J. A. Bowers*  
By *Munn & Co.*  
Attorneys.



# UNITED STATES PATENT OFFICE.

GEORGE W. ALLEN, OF MANCHESTER, COUNTY OF LANCASTER, AND  
HENRY J. A. BOWERS, OF ACTON, LONDON, ENGLAND.

## FEED-WATER PURIFIER.

SPECIFICATION forming part of Letters Patent No. 379,671, dated March 20, 1888.

Application filed November 18, 1887. Serial No. 255,507. (No model.)

*To all whom it may concern:*

Be it known that we, GEORGE WALLIS ALLEN, a resident of Manchester, in the county of Lancaster, England, and HENRY JOHN ALFRED BOWERS, a resident of Acton, London, England, subjects of the Queen of Great Britain, have invented a new and useful Improvement in Apparatus for Purifying Water for Steam-Boilers, of which the following is a specification.

In the specification to Letters Patent in Great Britain, No. 12,810, granted to one of us—namely, the said Henry John Alfred Bowers—on October 26, 1885, a scum-plate is described for the purpose of collecting from the water fed into steam-boilers the impurities thrown to the surface by ebullition, and conveying these impurities to an external vessel termed a “separator,” within which vessel they are deposited. Our present invention consists, chiefly, in the addition of a trough to the above-mentioned scum-plate with a view to its improvement, the said trough being placed between the feed-pipe and the scum-plate.

In some waters fed into boilers—such as river-water or canal-water—a very heavy earthy deposit exists, which, on entering a boiler through the feed-pipe, does not always rise to the surface of the water-level in the boiler, as lighter impurities do, but occasionally sinks to the bottom of the boiler, thereby at times evading the apparatus provided for its deposition, as already stated. The present device is intended to remedy this, and, in combination with the scum-plate, to collect and convey the heavier as well as the lighter impurities to the separator.

In order that our invention may be fully understood and readily carried into effect, we will describe the accompanying two sheets of drawings, reference being had to the figures and letters marked thereon.

Figure 1 is a perspective view of a steam-boiler to which our invention is applied, part of the shell of the boiler being removed to show the trough and scum-plate. Fig. 2 is a longitudinal section of the same, and Figs. 3 and 4 are detail views of the trough and scum-plate.

In the boiler A, which may be of any desired or approved construction, and either horizontal, as shown, or vertical, a scum-plate, *c*, is

fixed diametrically across the same at the water-level, the said plate being preferably of V shape, the sides or members thereof converging in a rearward direction in the construction illustrated. The apex of the scum-plate *c* communicates with a pipe, *c'*, the other end of said pipe delivering into a separator, *d*, for separating the impurities from the water, the preferred construction of said separator being fully described in the British patent above referred to. After separation of impurities the water is conveyed back to the boiler through the return-pipe *e*, which delivers at a point in the interior of the boiler below the mouth of the pipe *c'*, the circulation of the water from the boiler to the separator and back being according to the natural laws of gravity producing motion in an ascending and descending column of water of different temperatures. The apparatus above described effects the separation of the lighter impurities, and to insure also the separation of the heavier impurities, we employ, in conjunction with the said apparatus, a trough, *a*, of any suitable material, and, by preference, either V-shaped or U-shaped in cross-section, the ends of the trough being connected, respectively, with the feed-pipe *b* and the scum-plate *c*. It is not essential that the trough be actually secured to the scum-plate, as it may be otherwise suitably supported to deliver in close proximity to said plate.

We prefer to form the trough *a* with an open top and closed bottom throughout, as shown, and having its sides gradually decreasing in size from about the end at which it is connected with the feed-pipe *b* to near the opposite or delivery end, as shown clearly in Fig. 4.

By the use of this improvement the heavy impurities are deposited in the trough *a* and gradually conveyed to the scum-plate *c* and thence to the separator *d*, together with the lighter impurities collected by the scum-plate.

It is obvious that the form of the trough may be varied instead of having the straight form shown, and that the invention is applicable to other forms of boilers or generators than that shown.

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

The combination, with a boiler and with the

feed-pipe thereof, of a scum-plate, a trough in communication with the feed-pipe and delivering into the scum-plate, and a separator or collector of impurities, and connections between the boiler and separator, substantially as shown and described.

In testimony that we claim the foregoing as our invention we have signed our names, in

presence of two witnesses, this 1st day of November, 1887.

GEORGE W. ALLEN.

HENRY J. A. BOWERS.

Witnesses:

H. B. BARLOW,

S. W. GILLETT,

*Both of 17 St. Ann's Square, Manchester, England.*