

(No Model.)

A. W. WARD.

FEED WATER HEATER AND PURIFIER.

No. 321,406.

Fig. 1. Patented June 30, 1885.

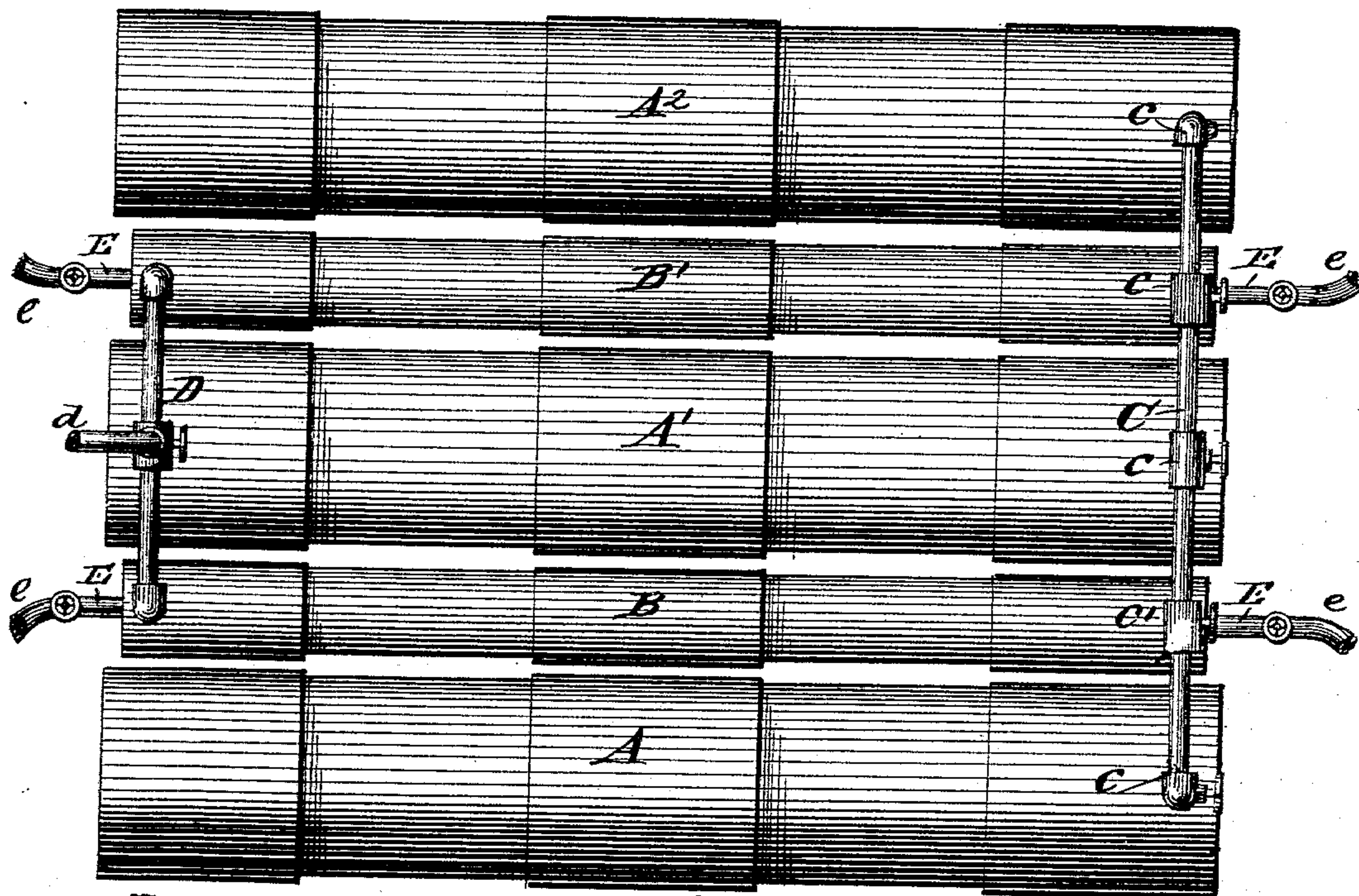


Fig. 2. B

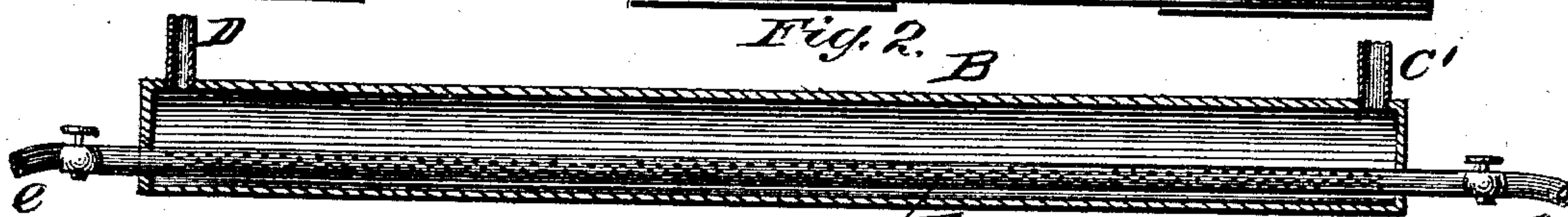


Fig. 3.

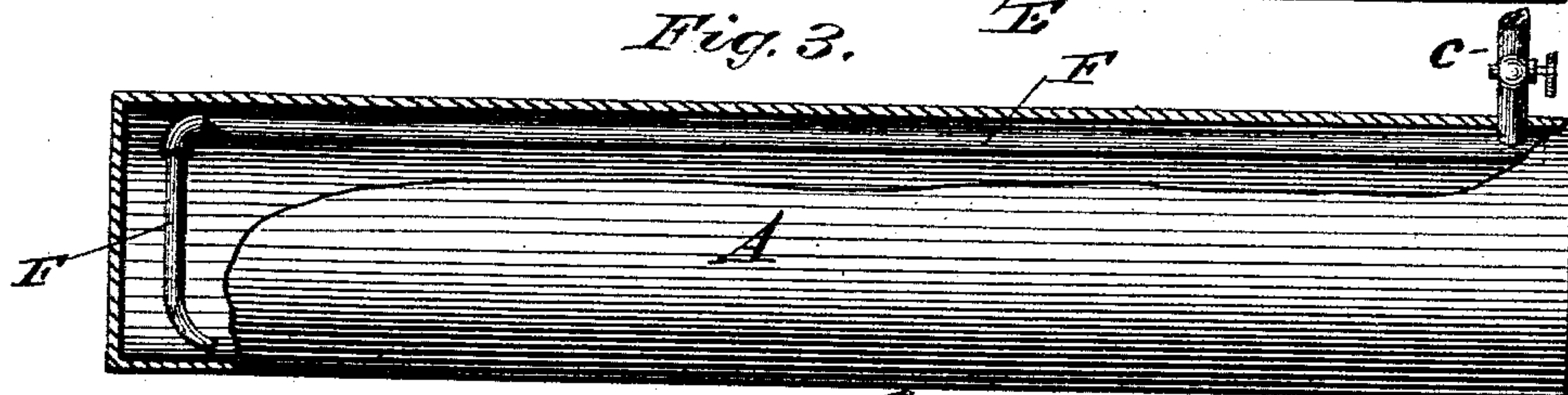
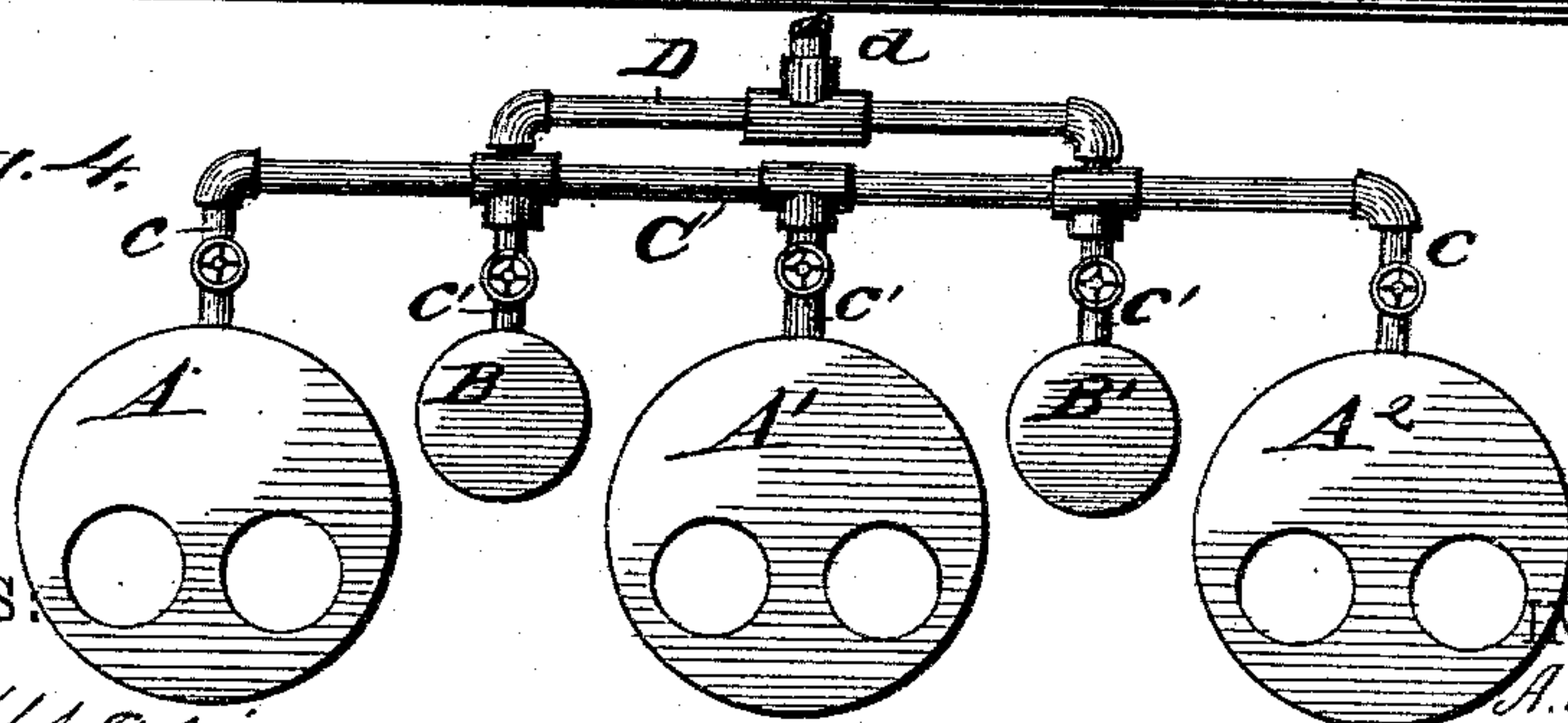


Fig. 4.



WITNESSES:

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ANDREW W. WARD, OF GALLIPOLIS, ASSIGNOR OF ONE-HALF TO MCILVAIN
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FEED-WATER HEATER AND PURIFIER.

SPECIFICATION forming part of Letters Patent No. 321,406, dated June 30, 1885.

Application filed October 30, 1884. (No model.)

To all whom it may concern:

Be it known that I, ANDREW W. WARD, a citizen of the United States, residing at Gallipolis, in the county of Gallia and State of Ohio, have invented certain new and useful Improvements in Feed-Water Heaters and Purifiers; and I do 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 or figures of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a plan view of my device. Fig. 2 is a vertical sectional view. Fig. 3 is a side view, part sectional; and Fig. 4 is an end view.

This invention relates to improvements in boilers, and is specially adapted to those used on rivers, or where the feed-water has many impurities, the main object of the invention being to free the feed-water from said impurities. A further object of the invention is to increase the area of heating-surface.

The invention consists in placing drums between the boilers of a gang, and passing the feed-water to the boilers from the drums. The drums supply an additional heating-surface for the water, and also collect the impurities and prevent them, in a full measure, from passing into the boilers.

The invention further consists in certain details of construction and arrangement of the parts hereinafter described.

In the accompanying drawings, and forming part of this specification, A A' A² represent three boilers of a gang placed side by side, and having between them the drums B B', as shown. The drums are flush with the upper part of the boilers, and are connected to the rear or after end thereof by the pipe C, the arms c c of said pipe descending to the boilers and the arms c c to the drums. All these arms are provided with suitable stop-cocks, as shown.

D is a tube connecting the forward ends of the drums B B', and having a proper en-

trance at d for water, which passes thence into the front or forward ends of the boilers by means of the pipe C and arms or tubes c c and c' c'.

E is a perforated pipe fixed longitudinally through each drum, and having on each end a blow-off pipe, e e, as shown.

The water is heated while in the drums up to the point of making steam, and deposits all of its impurities—such as mud, sand, or any scale-forming substance—in the drums, from which the said impurities may be expelled by means of the perforated pipe E and the blow-offs, the pipe lying upon the floor or bottom of the drum in position to receive the impurities.

When the water enters any one of the boilers, it first enters a large pipe, F, contained therein. The said pipe F runs along the roof of the boiler longitudinally, and has its front end curved or bent downward so as to carry the water to the forward part of the bottom of the boiler, whence it flows aft on the floor. Thus there is a current of water on each boiler, running along the roof of the same in a forward direction, and along the bottom in an aft direction.

Some of the advantages of the invention are as follows: It affords a much greater area of heating-surface than in the usual construction. It heats the water in the drums to the steam-point and deposits in the drums all of the scale-forming substance. The boilers are not liable to be burned, thereby lessening the danger to life and property, because of the free circulation of water. From twenty to twenty-five per cent. is saved in the expense of running the engine, the larger heating-surface making less fuel and time necessary to produce the result, and the purity of the water in the boilers aiding in the same.

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

1. The combination of the drums B B', arranged, respectively, between the boilers, and provided with a perforated tube, E, having a blow-off on each end, and the boilers A A' A², each having communication at its rear

end with one or more of the drums and provided with the tubes F, arranged substantially as shown and described.

2. The combination, with the boilers A A' 5 A², each provided with a tube, F, of the drums B B', each provided with a perforated blow-off tube, E, the pipe C, having the arms or extensions *c c* and *c' c'*, and the tube D, hav-

ing a water-entrance therein, substantially as specified.

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

ANDREW W. WARD.

Witnesses:

DAVID W. JONES,

JNO. M. ALEXANDER.