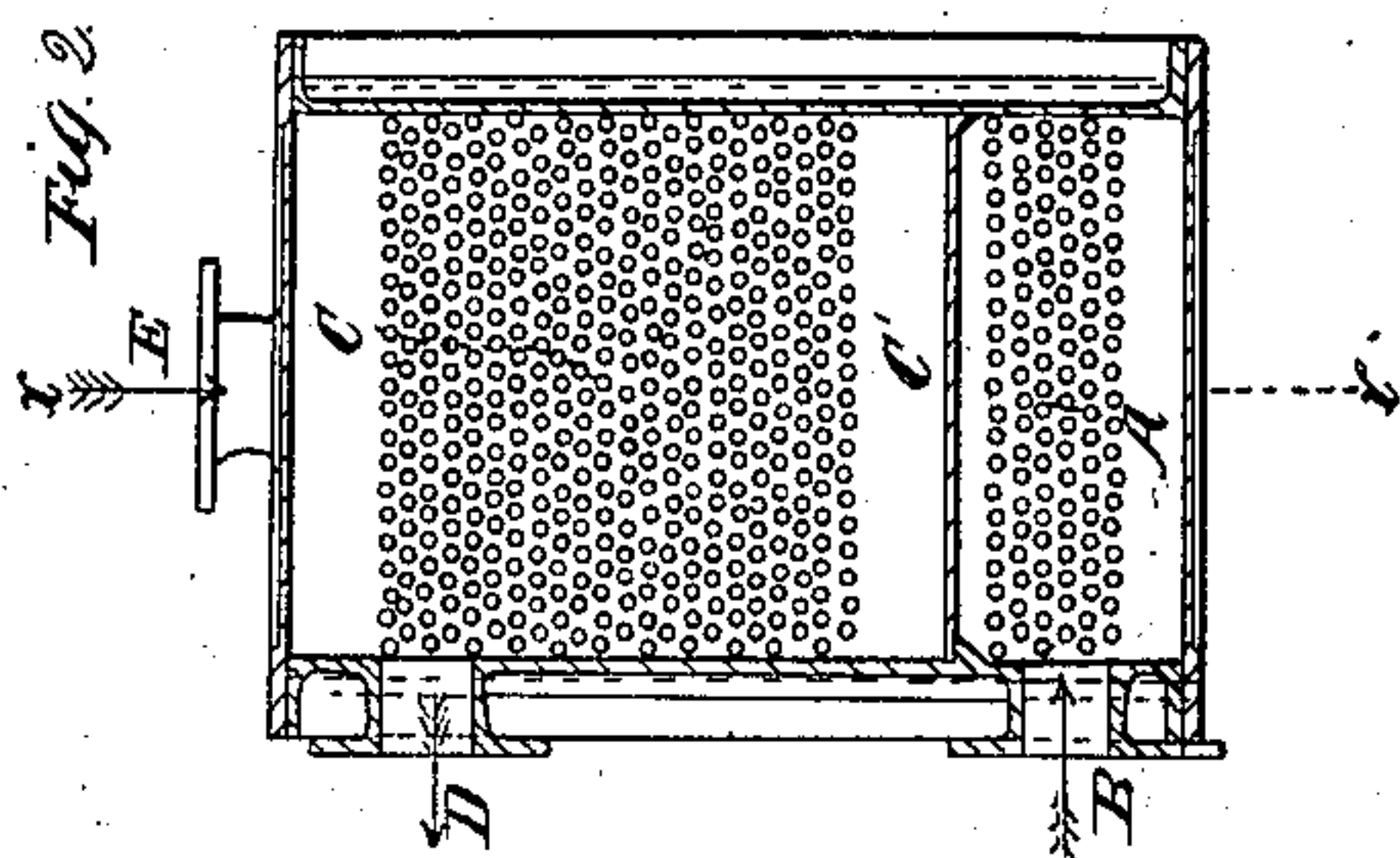
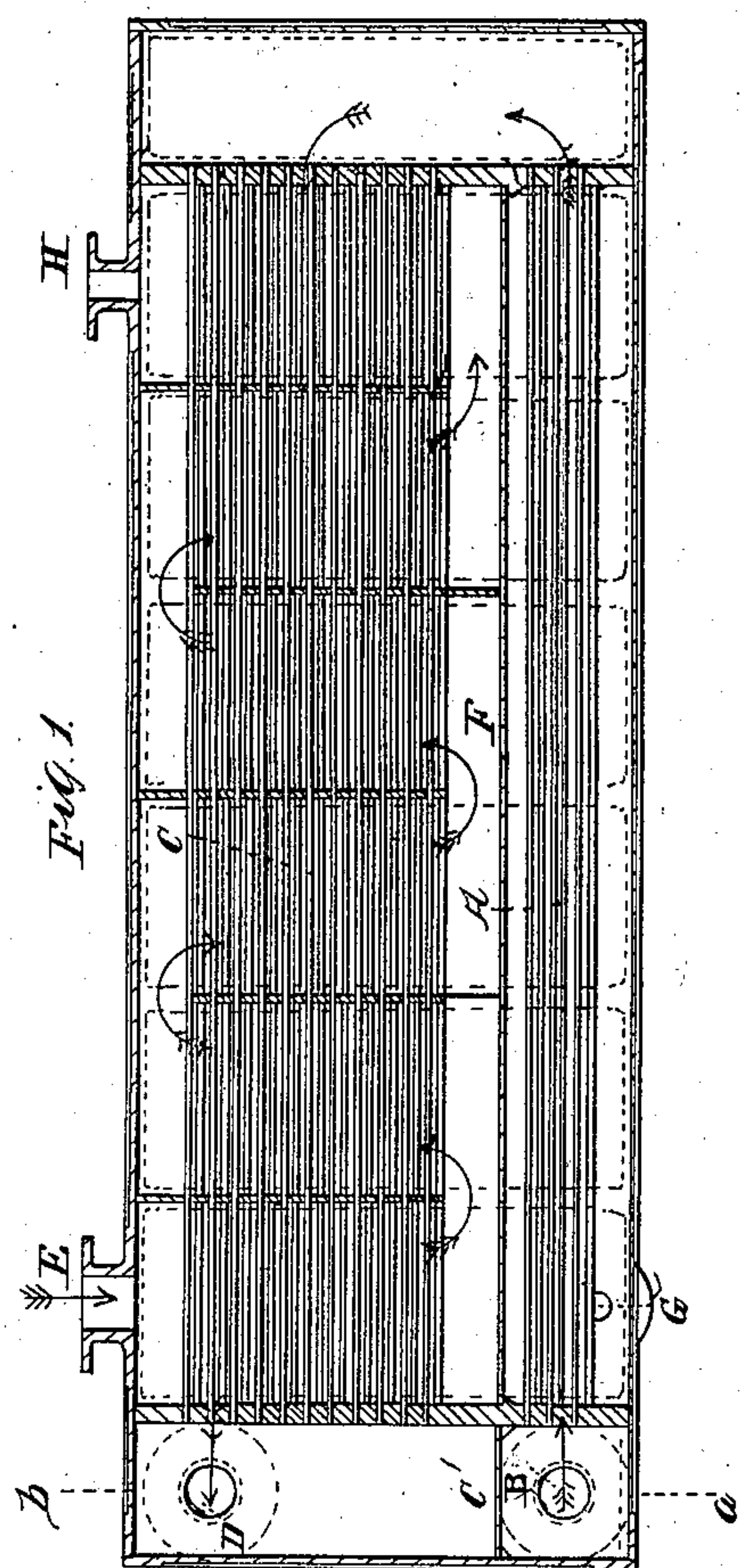


W. A. Lighthall,
Steam-Boiler Condenser.

N^o 46,254.

Patented Feb. 7, 1865.



Witnesses:
Francis S. Long
Byron S. Mower

Inventor:
Wm. A. Lighthall.

UNITED STATES PATENT OFFICE,

WILLIAM A. LIGHTHALL, OF NEW YORK, N. Y.

IMPROVEMENT IN CONDENSERS.

Specification forming part of Letters Patent No. 46,254, dated February 7, 1865.

To all whom it may concern:

Be it known that I, WILLIAM A. LIGHTHALL, of the city, county, and State of New York, have invented certain new and useful Improvements in Condensers for Making Potable Water from Salt or other Unpotable Waters; and I do hereby declare that the following is a full and exact description of the same, reference being made to the accompanying drawings, and to the letters of reference marked thereon, in which—

Figure 1 is a vertical longitudinal section taken through the line marked *xx* in Fig. 2; and Fig. 2 is a transverse section taken through the line marked *ab* in Fig. 1.

My invention relates to an improvement upon the potable-water condenser secured to me by Letters Patent of the United States under date of April 22, 1862; and it consists in taking the supply of cooling water through the tubes of the lower (or cooling) section of the condenser and returning it through the upper (or condensing) series of tubes, whereby the water condensed and collected in the lower section is more thoroughly cooled than it would be if the cooling water entered both the condensing and cooling tubes at the same time, and whereby the purpose of the condensation of the steam in the apparatus is more thoroughly effected with the same supply of cooling water than it would be by the flow of cooling water through the condensing-tubes alone. This arrangement also effects the object of bringing the cooling-water delivery-pipe, the cooling-water receiving-pipe, the entrance-pipe for the steam to be condensed, and the pipe for carrying off the condensed water at the same end of the apparatus, whereby the whole series of pipes can be got at for repair or examination more readily than if they were placed at opposite ends of the apparatus.

The case of the condenser, its division-plates and tubes, and its drip-plate and drip-reservoir are constructed and arranged the same as those shown and described in the Letters Patent above named, excepting that the tubes in the cooling-section A are increased in number sufficiently to receive and pass through the supply of cooling water re-

ceived through the nozzle B, and that the number of tubes in the condensing-section C is decreased in the same proportion, and also that the division-plate C' is placed in the head space of the apparatus (as shown) to divide that space into two sections, so that the first action of the cooling water received through the nozzle B shall be through the cooling-tubes A, in order that the condensed water falling into the cooling-section shall be more thoroughly cooled than it would be if the said plate were not used. The cooling-water is received through the nozzle B, and, after passing through the cooling-tubes A, is returned back through the condensing-tubes C, and is passed off through the nozzle D. The steam to be condensed is received into the apparatus through the nozzle E and passes across and between the tubes in section C, as shown by the darts in Fig. 1, the condensed water falling into the cooling-section through apertures made at proper intervals in the drip-plate F, and being taken off through the nozzle G. The nozzle H is used to take off the incondensable vapor. By this arrangement the condensed water in the drip-reservoir can be cooled down to such degree as to render it fit for use when delivered from the nozzle G, so that the condensed water does not require to "stand" to be cooled after being made.

The arrangement of the receiving and delivery cooling-water pipes and the steam and condensed water delivery pipes at the same end of the apparatus is of great advantage, as it brings all the said pipes at one end of the apparatus, where they can readily be got at for repair or examination, and enables the apparatus to be erected in positions (particularly on shipboard) where it would be impossible or impracticable to erect it if the pipes named were at the opposite ends of the apparatus.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the division-plate C' with the section of cooling-tubes A, as and for the purpose set forth.

2. The combination of the division-plate C, with the tube-sheet and cover to the end o

the case (as shown) for the purpose of dividing the space between the said tube-sheet and cover into two sections, as set forth.

3. The arrangement of the cooling-water receiving nozzle B, the cooling-water delivery-nozzle D, the steam-nozzle E, the condensed-water nozzle G, and the division-

plate C', placed at the same end of the apparatus, as shown, and for the purposes set forth.

WM. A. LIGHTHALL.

Witnesses:

FRANCIS S. LOW,

BYRON S. MIXER.