

D. H. Chamberlain,

Steam-Boiler Tube.

N^o 33,763.

Patented Nov. 19, 1861.

Fig 2.

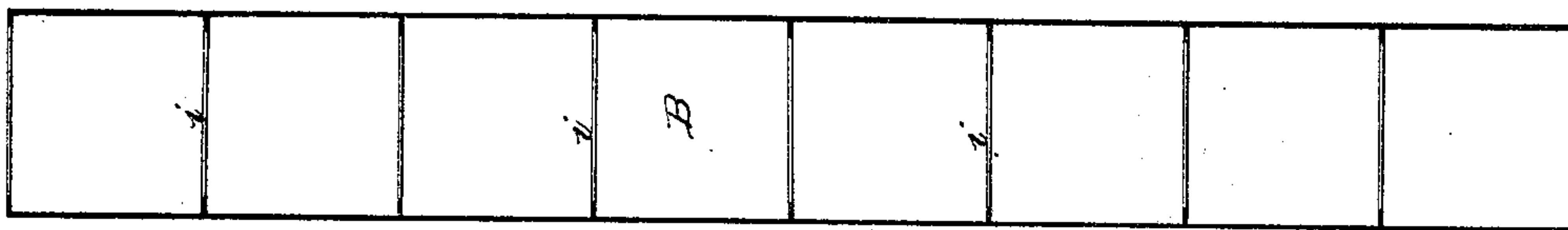


Fig 1.

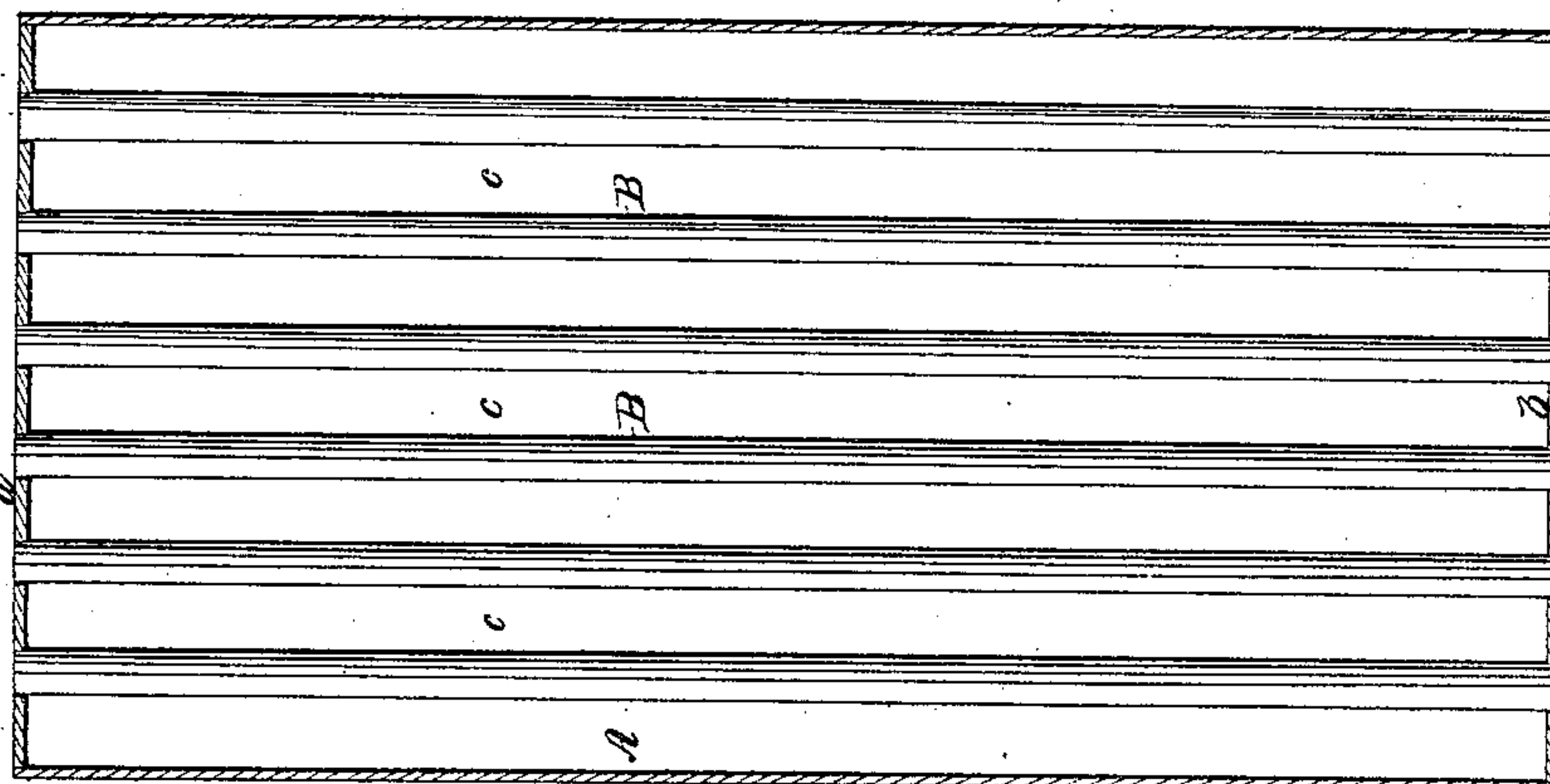
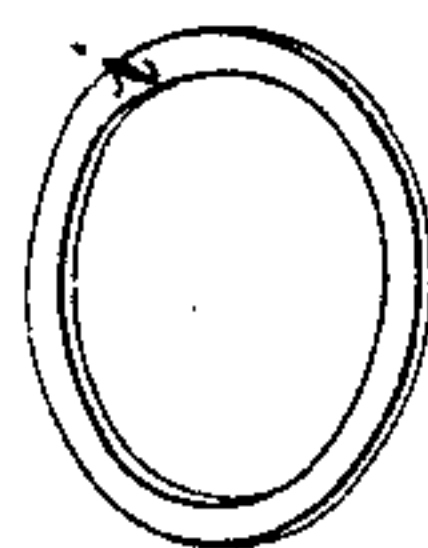


Fig 3.



Witnesses.

Thos. R. Roach
P. E. Tschernack

Inventor
D. H. Chamberlain

UNITED STATES PATENT OFFICE.

DEXTER H. CHAMBERLAIN, OF WEST ROXBURY, MASSACHUSETTS, ASSIGNOR
TO HIMSELF AND ALEXANDER H. TWOMBLY.

IMPROVEMENT IN TUBES FOR SURFACE CONDENSERS.

Specification forming part of Letters Patent No. 33,763, dated November 19, 1861.

To all whom it may concern:

Be it known that I, DEXTER H. CHAMBERLAIN, of Roxbury, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Surface Condensers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a vertical section through a condenser, showing one row of tubes, (the tubes in view;) Fig. 2, a longitudinal section through one of the tubes, enlarged; Fig. 3, a view of one of the strengthening-rings.

It is well known that it is desirable in surface condensers to have the metal of which the tubes are made as thin as possible consistent with a sufficient degree of strength to resist the pressure to which they are subjected.

The object of my present invention is to produce a condenser having these requisites, and in which the metal of the tubes shall be so thin as to permit the heat to pass rapidly from one surface to the other of the metal, at the same time that the tubes have strength enough to resist the pressure produced by the vacuum; and my invention consists of a surface condenser the tubes of which are strengthened by rings applied to the tube at short intervals of its length, whereby I am enabled to employ thinner metal in the construction of the tubes than has heretofore been practical.

That others skilled in the art may understand and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawings, A is the condenser; *a b*, the tube-sheets, in which are secured the tubes B. The water for cooling the tubes is

passed freely through the spaces *c* between the tubes, surrounding them on all sides, while the steam or vapor to be condensed is passed through the tubes. One of these tubes B is shown detached and in section in Fig. 2. It is strengthened by means of the rings *i*, attached to its inner surface at short intervals. These rings *i* (one of which is shown in Fig. 3) are stamped out from a thin sheet of metal which has been previously tinned, and are introduced into the tube by a suitable mandrel and are pushed up to their proper positions one at a time. After each one is placed it is soldered to the tube by having a sufficient heat applied to the tube to soften the tin on the ring, when pressure is applied to the ring by an expanding follower introduced from the opposite end of the tube. This sets the ring into intimate contact with the surface of the tube, to which it adheres. It is necessary that these rings should be as thin as is practicable, as otherwise they would accumulate heat to a degree detrimental to the action of the tube.

In some instances it may be preferred to pass the cold water through the tubes B and the steam or vapor through the spaces *c*, in which case I would apply the rings *i* to the exterior of the tubes, in order to give a free passage to the water.

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

A surface condenser having its tubes strengthened by rings, as set forth, for the purpose specified.

D. H. CHAMBERLAIN.

Witnesses:

THOS. R. ROACH,

P. E. TESCHEMACHER.