

2 Sheets, Sheet 1.

J. Montgomery,
Steam-Boiler Tubes.
N^o 26,779. Patented Jan. 10, 1860.

Fig. 1.

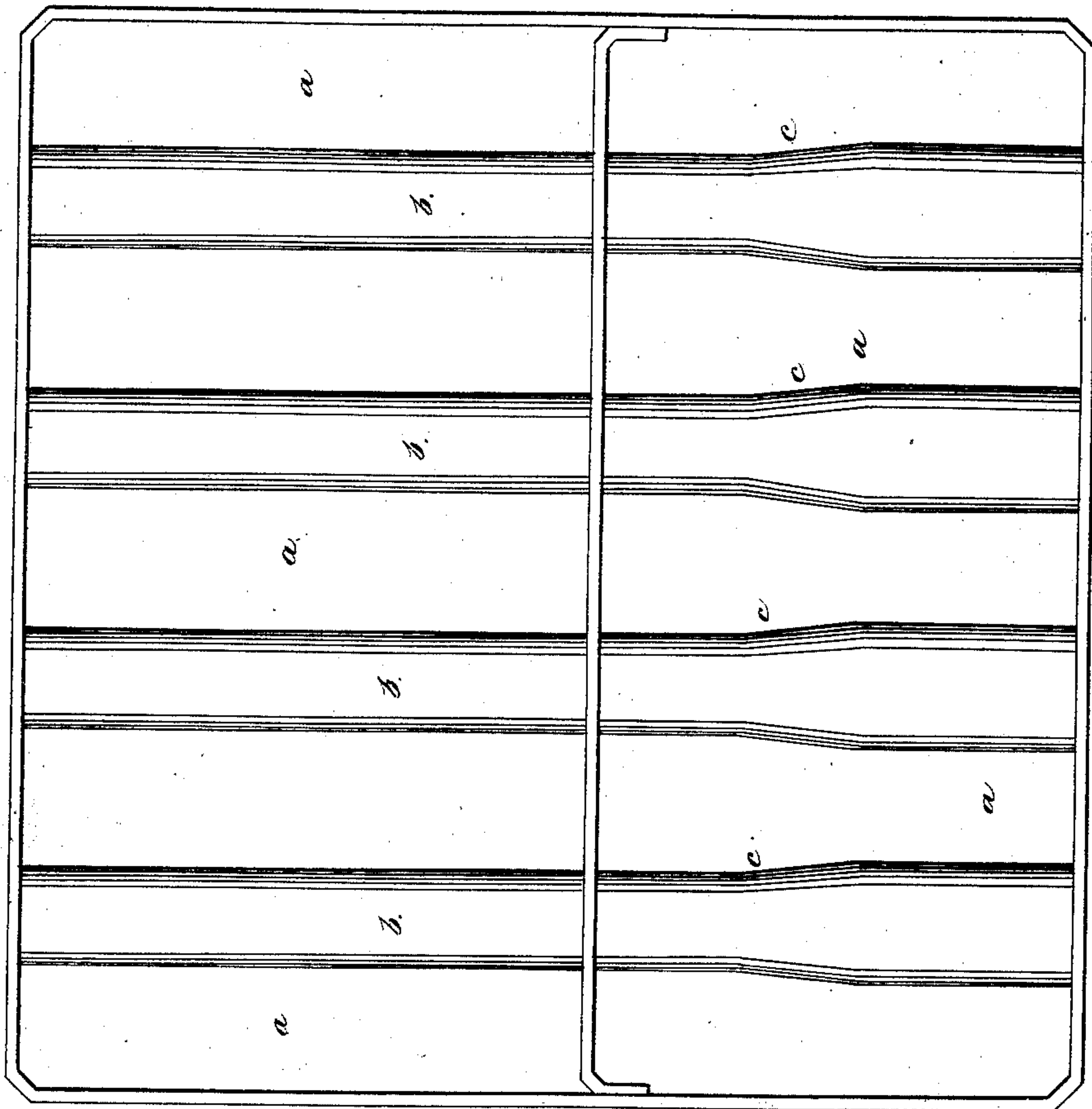
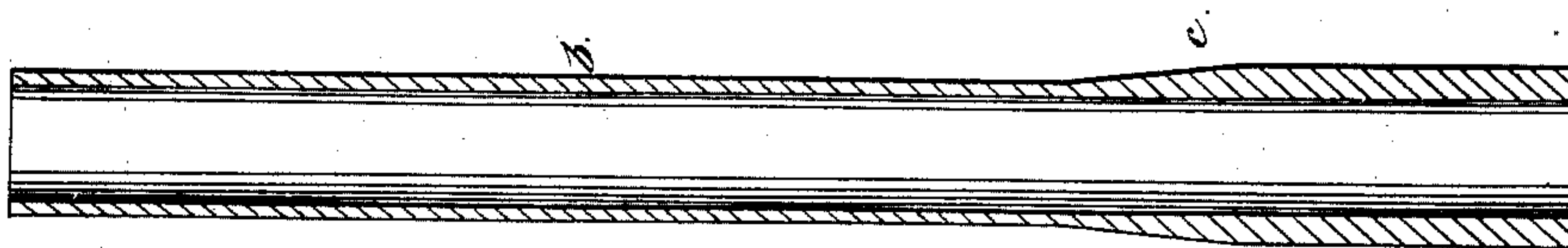


Fig. 2.



Witnesses:

J. W. Bishop
Wm. C. Brown

Inventor:

J. Montgomery

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Fig. 1.

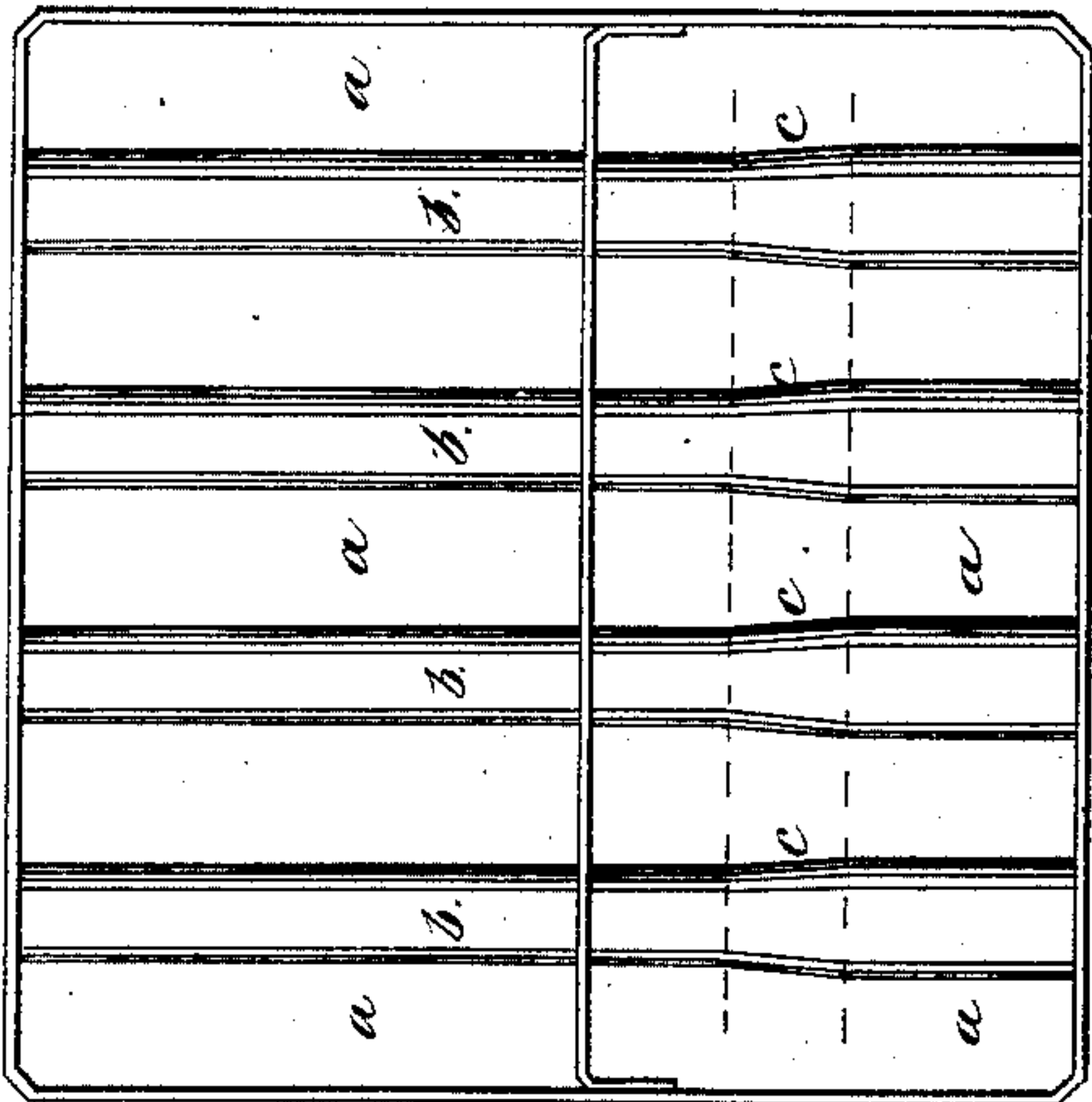
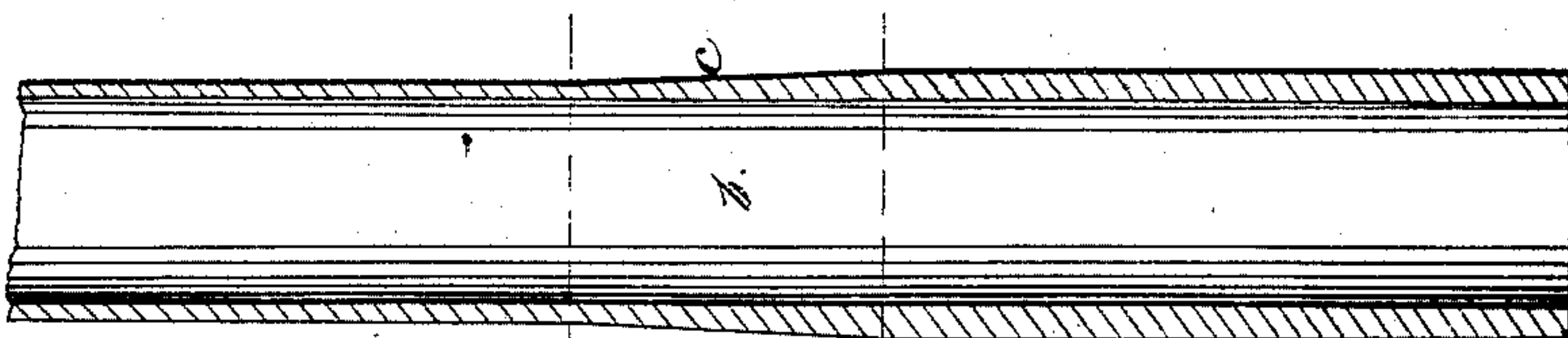


Fig. 2.



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J. H. Bishop
Wm. C. Brown

Inventor:

James Montgomery

UNITED STATES PATENT OFFICE.

JAS. MONTGOMERY, OF BALTIMORE, MARYLAND.

CONSTRUCTION OF STEAM-BOILERS.

Specification of Letters Patent No. 26,779, dated January 10, 1860.

To all whom it may concern:

Be it known that I, JAMES MONTGOMERY, of Baltimore, in the county of Baltimore and State of Maryland, have invented a certain
5 new and useful Improvement in Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this
10 specification, in which—

Figure 1 is a section of the flue chamber of a boiler; and Fig. 2, a longitudinal section of one of the tubes on an enlarged scale.

15 The same letters indicate like parts in both figures.

My invention relates to a mode of rendering the vertical tubes of tubular steam boilers more durable than heretofore. It has
20 been found by experience that the lower end of the vertical water tubes of such boilers are in a comparatively short time destroyed, and in a much shorter time than the upper end. This, it is believed, is due to the
25 deteriorating influence of salts and other substances which lodge around the outside of the tubes near their lower end; but whether such deterioration be due to this or any other cause, I have found by ex-
30 periment the difficulty is in a great measure obviated by making the tubes of greater thickness; but this remedy begets other and even greater difficulties, as it greatly in-
35 creases the weight of the boiler, reduces the capacity of the tubes for economical evaporation, and renders them more liable to be burned out. But by my invention I am
40 enabled to render the tubes more durable than heretofore while at the same time they will transmit the heat to the water passing through them as readily, and evaporate the water as economically, as heretofore.

To this end my said invention consists in making the said tubes at and near their
45 lower end of greater thickness, than at and near the upper end. In this way that portion of the length of the tubes which is but slightly acted upon by the heat, and acted upon injuriously by the matter which lodges
50 around them, is effectually protected by the increased thickness of the metal, while that portion of their length which is efficient in the generation of steam can be made as thin as safety against pressure will permit, to
55 be effective in the transmission of heat to the water passing through them.

In the accompanying drawings *a* represents the flue space of a boiler in which are arranged the vertical water tubes *b* which connect the upper and lower water spaces, 60 well known as the Montgomery boiler. The bore of these tubes is of equal diameter from end to end, as represented on an enlarged scale at Fig. 2 of the drawings, and the outer surface is also of equal diameter from the 65 upper end to within a few inches of the lower end where the diameter is increased as at *c* to increase the thickness of the metal for the purpose above stated. It will be obvious that the same result may be attained 70 by making the tube of an equal external diameter from end to end, and the inner diameter or bore of unequal diameter so as to obtain the greater thickness required at the lower end; but I prefer the mode first 75 specified.

I wish it to be understood that I do not claim making tubes with one of their ends thicker than the other—that being a device well known in connection with what is called 80 the “locomotive boiler”, the tubes of which are termed “flue tubes” and are at their ends next to the fire-box made thicker than at their other ends for the reasons following: First, from the want of proper circulation 85 in the boiler, the great heat necessarily applied to them at their fire-box ends drives the water from around these ends and would cause them to be rapidly burned out were they not made thicker than the smoke-box 90 ends. Second, by reason of the great draft, most of the sparks and cinders are drawn up into the tubes and by constant friction against their interior surfaces would, in consequence of the greater heat of the metal 95 next to the fire-box, soon cut through them there, were they not made thicker at their fire-box ends than at their other ends—as above described. But, as already stated, my invention relates to the tubes of vertical 100 water tube boilers and is intended by means, as described, of the greater thickness of metal at their lower ends to which the least heat is applied, to protect these ends from the deteriorating influences above referred 105 to while, at the same time, the less thickness of the upper portions, to which the greatest heat is applied, enables the products of combustion to act upon them with the most advantageous effect. It will thus be 110 seen that the design and principle of operation of my device is precisely the re-

verse of that employed in the "locomotive boiler" and, furthermore, that I make use of it for a purpose entirely different from that sought to be accomplished in said "locomotive boiler."

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

Making vertical or nearly vertical water tubes for steam boilers or other purposes, with their lower ends to which the heat from

the furnace is applied at its lowest temperature, thicker for any desired portion of their length than their upper ends to which the heat is applied at its greatest intensity, in the manner and for the purposes substantially as above set forth.

JAMES MONTGOMERY.

Witnesses:

WM. H. BISHOP,
WM. C. BROWN.