

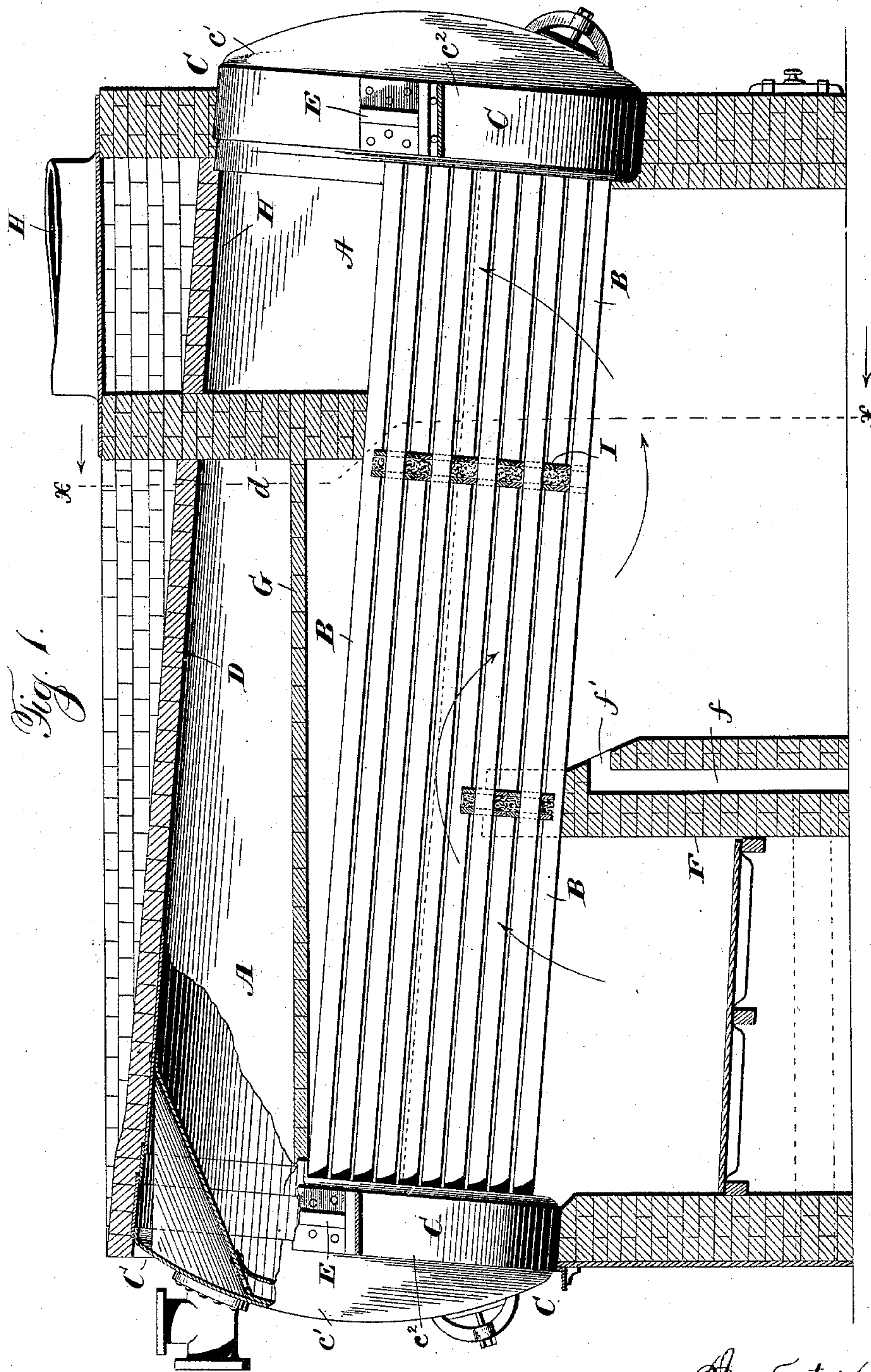
(No Model.)

2 Sheets—Sheet 1.

J. MACCORMACK.
STEAM BOILER.

No. 476,053.

Patented May 31, 1892.



Witnesses:
Jas. E. Hutchinson.
Henry C. Hazard.

Inventor.
John MacCormack, by
Crindle and Russell, his Attys

(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

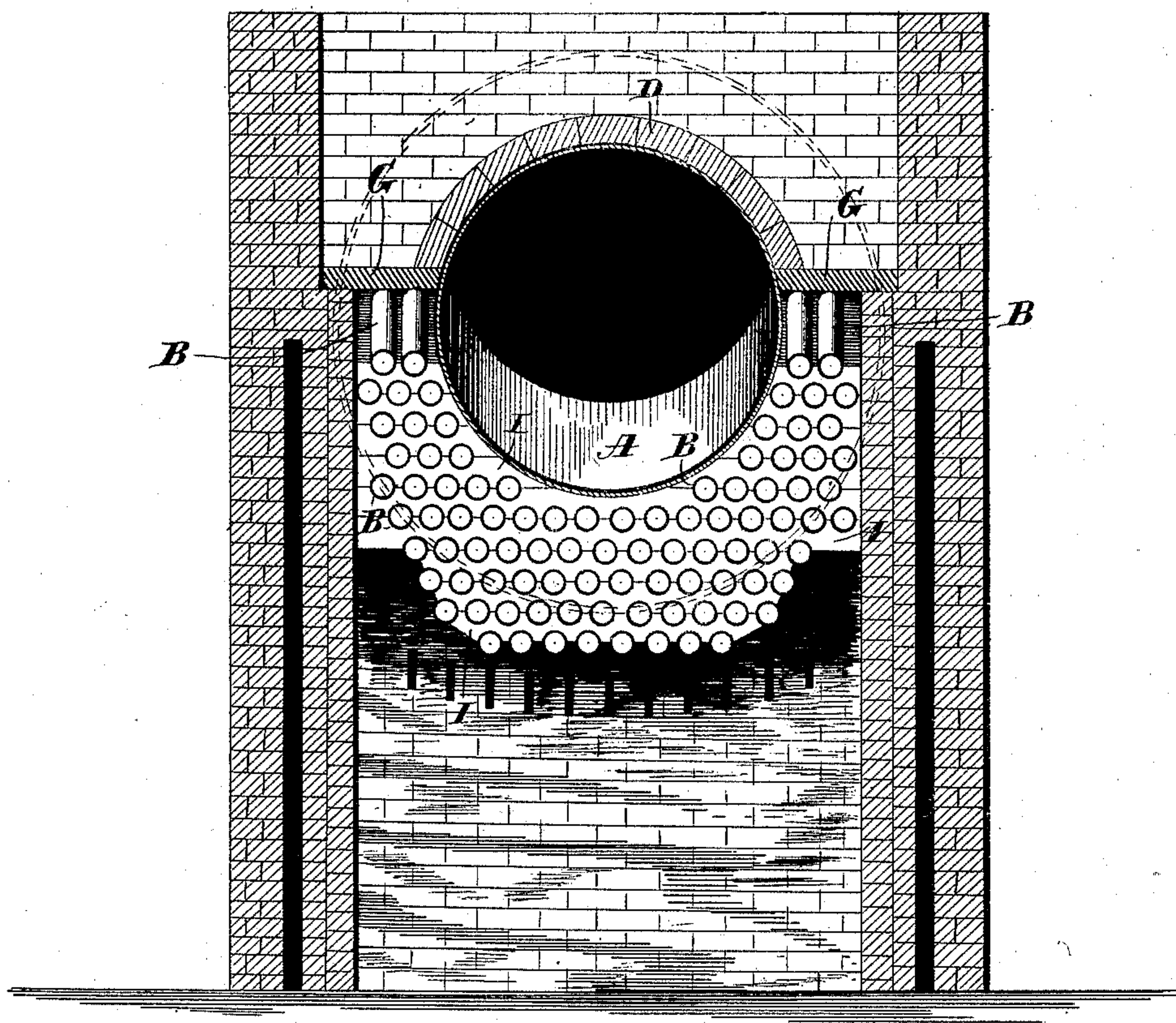


Fig. 3.

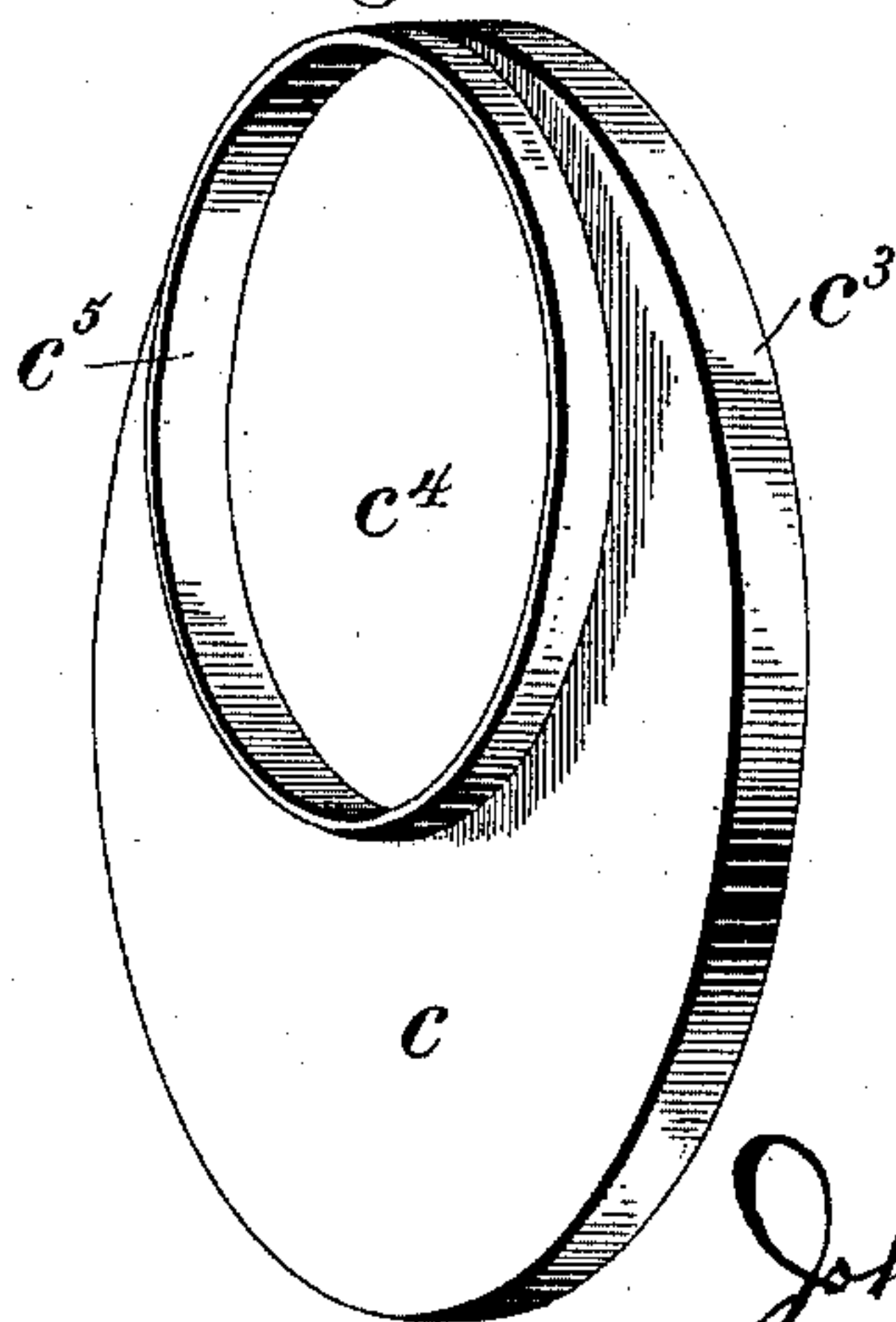


Fig. 4.

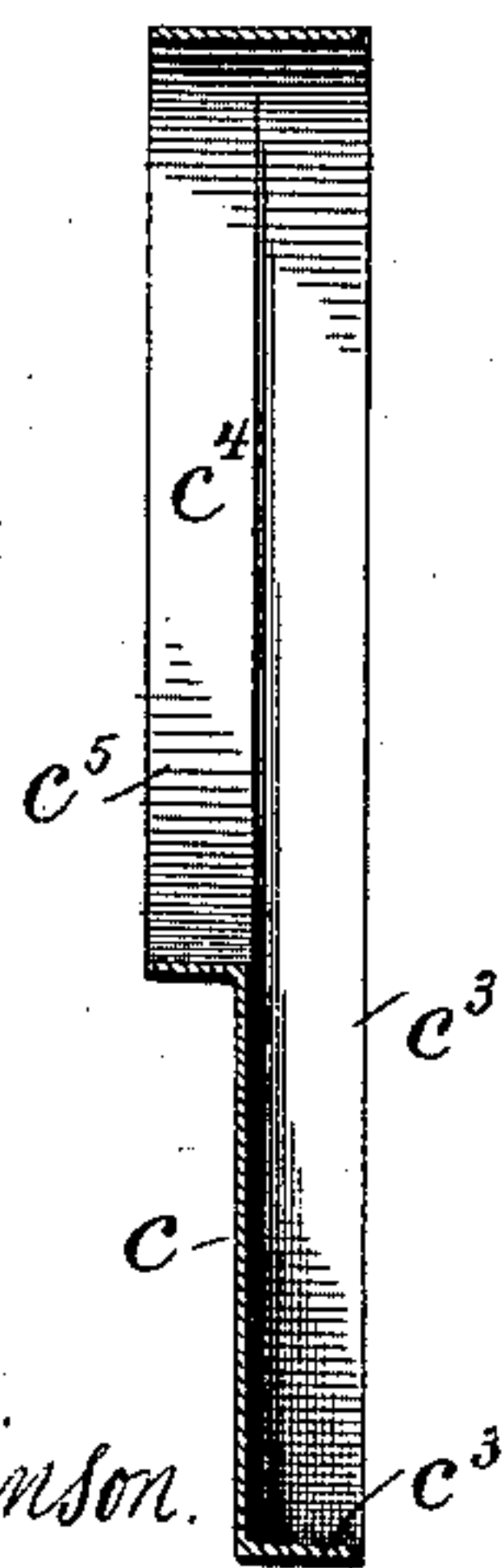
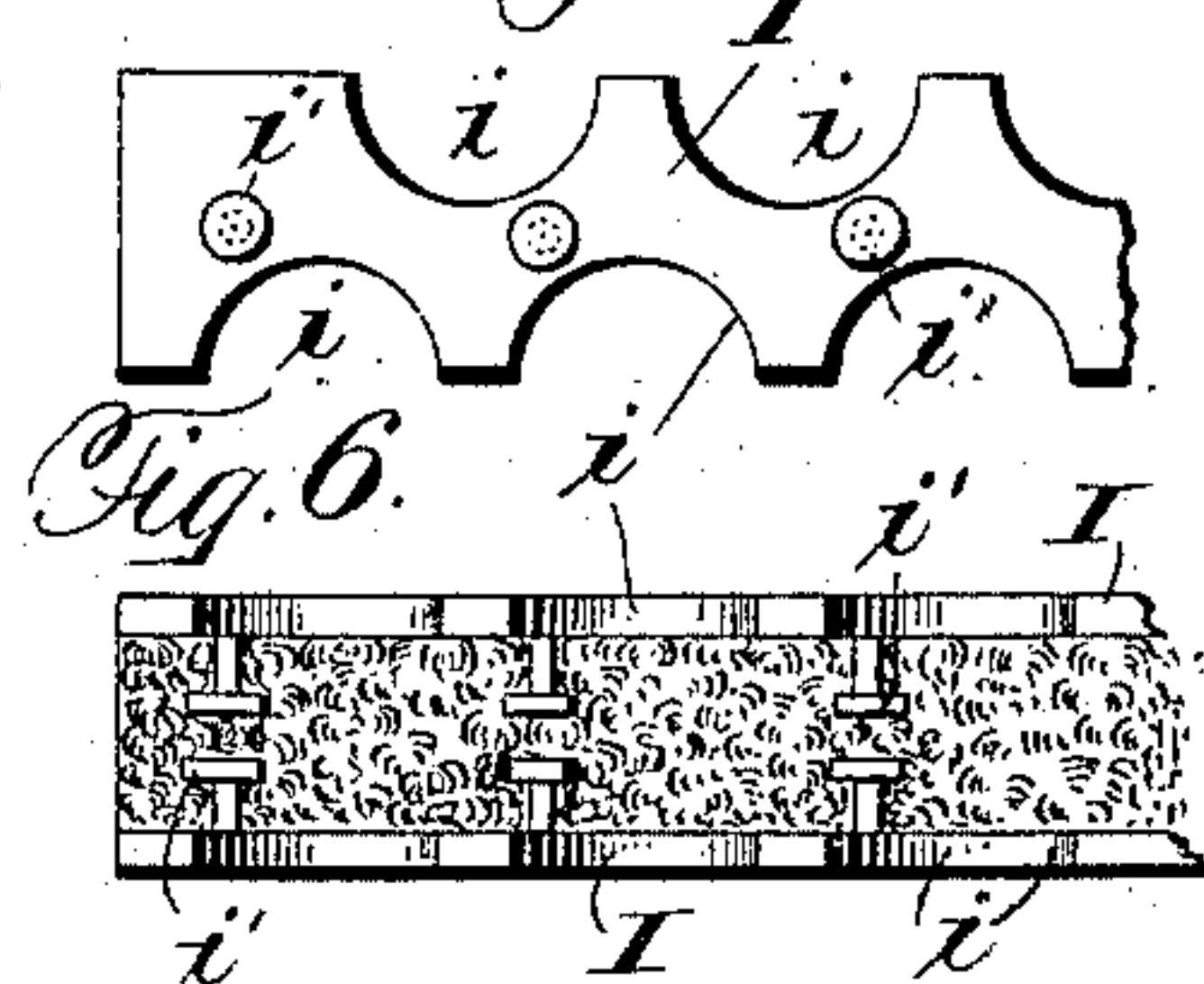


Fig. 5.



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UNITED STATES PATENT OFFICE

JOHN MACCORMACK, OF ALBANY, NEW YORK.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 476,053, dated May 31, 1892.

Application filed October 8, 1891. Serial No. 408,019. (No model.)

To all whom it may concern:

Be it known that I, JOHN MACCORMACK, a citizen of the United States, residing at Albany, in the county of Albany, and in the State of New York, have invented certain new and useful Improvements 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, in which—

Figure 1 is a view, partly in section and partly in elevation, of a water-tube boiler and brick-work therefor constructed in accordance with my invention; Fig. 2, a transverse section on the line $x x$, Fig. 1; Fig. 3, a detail view in perspective of the plate forming one of the walls of the water-heads and constituting the means of attachment to said heads of the boiler-shell and water-tubes; Fig. 4, a section through the same; Fig. 5, a detail view, in elevation, of a portion of one of the plates which form a part of the wall or partition upon the tubes for deflecting the course of the heated gases from the furnace; and Fig. 6, a detail view, in horizontal section, of a portion of said wall.

Letters of like name and kind indicate like parts throughout the several figures.

The object of my invention is to improve the construction of steam-boilers, whereby the same may be rendered more economical and efficient in use and more cheaply put upon the market; and to these ends it consists in the parts thereof constructed and combined substantially as and for the purposes hereinafter specified.

The description or type of steam-boiler which I have sought to improve is the water-tube boiler; and as constructed by me the same consists of a cylindrical boiler-shell A and a series of parallel tubes B, attached to and supported both at opposite ends by two water-heads C and C. Each water-head is made of an inner plate c , to which the boiler-shell and tubes are fastened, and an outer convex or dished plate c' , which are both riveted to the opposite edges of an annulus or ring c^2 . The plate c is circular in shape and has an annular flange c^3 extending around its edge, by which it is riveted to the ring c^2 , and in its upper portion said plate has an eccentrically-located opening c^4 , which is surrounded by an annu-

lar flange c^5 , that extends in a direction reverse to that of flange c^3 , into which projects the end of the boiler-shell and to which the same is riveted. The position of the flanged opening c^4 is such that its flange c^5 is in the same plane at the top as the flange c^3 on the plate. The tubes may be attached to the plate c in any suitable way, and they are disposed beneath the shell and about half-way up around the sides thereof. Suitable brick-work D is built around the boiler as thus constructed, and the latter is supported on the end walls thereof by means of angle-plates E and E, secured to the sides of the water-heads, which engage said walls. The front water-head is rigidly or fixedly supported; but the rear one is supported so as to allow such movement as is incidental to the expansion and contraction of the parts—as, for instance, by having rollers placed between the angle-plates and the supporting part of the wall.

At the front water-head provision is made for the egress of steam for use and the attachment of the safety-valve, &c., and in the two heads manholes are provided in the dished plates thereof near their bottoms to enable access to their interiors when necessary.

The furnace, as usual, is located under the forward part of the boiler, being provided with any desired form of grate and having a fire or bridge wall F situated substantially midway between the end walls of the brick-work.

To utilize the products of combustion to the best possible advantage by subjecting the whole length of tubes as nearly as possible to them, I provide on each side of the shell A, just above the top row of the tubes, partitions G and G, composed of fire-tiles, which extend from the shell to the adjacent part of the brick-work and from the front water-head to a wall d , arched over the upper half of said shell near the rear head and forming part of the uptake H, and a substantially vertical partition I, that closes up the spaces between the tubes, extends from and immediately below the arched wall d . The products of combustion from the furnace will pass therefrom and by reason of the horizontal partitions G and G and the vertical one I be compelled to take a circuitous course—such as indicated by the arrows—before eventually making their exit through the uptake, being thus placed

into contact with the tubes throughout their length. To aid the draft, the bridge or fire wall F is provided with a number of vertical air flues or ducts f , having at their upper ends horizontal extensions f' , directed rearwardly toward the uptake H.

The wall or partition I, in order that it may readily be built after the water-tubes have been secured to the water-heads and be enabled to endure the heat to which it will be subjected, is constructed of two separated series of non-conducting plates superimposed on each other to form a continuous piece from the top row of tubes to the bottom row, between which series is placed a fire-resisting compound. Each of said plates of a series has a width equal to the distance from the center of one row of tubes to the center of an adjacent row, a length to extend across the entire line of tubes in a row, and a thickness a trifle less than the space between two adjacent rows of tubes, being at its opposite edges provided with semicircular openings i , whose diameter is the same as that of the tubes. Thus constructed said plate is inserted edgewise in the space between two adjacent rows of tubes, and when properly positioned with relation to them is turned through a quarter-circle, so as to place its semicircular notches into engagement with appropriate tubes. This is repeated with other similar plates until the two separated series before mentioned are complete. Then with a board or other object placed across the bottom plates of the two series to temporarily close the space between a compound of asbestos and kaolin, made by thoroughly mixing the former with the latter in a liquid condition, is poured between the two series of plates to fill the space between them and then hardened.

In order to key or lock the composition and plates together, each plate has a number of inwardly-projecting headed studs i' , around which the compound collects. Between the top of the bridge-wall and several rows of the tubes adjacent thereto I also place a similarly-constructed partition.

Although I have shown and described a horizontally-arranged boiler, it is to be understood that there are features of my invention applicable to vertical boilers as well and that I contemplate the latter arrangement should it be found necessary or desirable—as, for instance, in buildings where economy of floor-space must be considered. When the boiler is to be placed vertically, one of the water-heads should be increased in length and placed uppermost in setting to provide necessary steam-space.

Having thus described my invention, what I claim is—

1. In a steam-boiler, in combination, the boiler-shell, the water-tubes disposed beneath the same, the fire or bridge wall, the horizontal partition arranged above said tubes and ex-

tending from each side of the boiler-shell, the means for ultimately discharging the products of combustion, and the partition intermediate said bridge-wall and the latter, substantially as and for the purpose specified.

2. In combination with the tubes of a boiler, the two series of separate superimposed plates, said series being separated by a space, and the fire-resisting compound in such space, substantially as and for the purpose described.

3. In combination with the tubes of a boiler, the partition or wall composed of a series of superimposed plates consisting each of a piece notched in its opposite edges to partially embrace the tubes of adjacent rows and a fire-resisting body secured to said plates, substantially as and for the purpose specified.

4. In combination with the tubes of a boiler, the partition or wall thereon consisting of a series of superimposed plates, each of which has notches in its opposite edges to partially embrace the tubes of adjacent rows, a fire-resisting body, and the studs or keys on said plates to engage said body, substantially as and for the purpose shown.

5. In combination with the tubes of a boiler, the partition or wall thereon consisting of two series of superimposed plates, each of the latter having notches in opposite edges to partially embrace the tubes of adjoining rows, and the fire-resisting substance placed between the two series of plates while in a plastic condition, substantially as and for the purpose described.

6. In combination with the tubes of a boiler, the wall or partition thereon consisting of a fire-resisting body placed between two plates, each of which has inwardly-projecting headed studs or keys engaging such body, substantially as and for the purpose set forth.

7. In combination with the tubes of a boiler, arranged in parallel rows, the partition or wall formed in part by a series of plates, each of which has such thickness as to enable it to be passed between the tubes of adjacent rows and in its opposite edges is notched to partially embrace said tubes, substantially as and for the purpose specified.

8. In combination, the boiler-shell, the series of water-tubes disposed beneath the lower half thereof, a fire or bridge wall, the horizontal partitions on each side of the boiler-shell, the uptake, the wall arched over the upper half of the boiler-shell just in advance of the latter, and the partition or wall on the tubes extending downward from said arched wall, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 6th day of July, 1891.

JOHN MACCORMACK.

Witnesses:

CHAS. S. BYINGTON,
THOMAS A. BECKET, Jr.