T. W. GODWIN.

VERTICAL STEAM BOILER.

No. 176,296. Patented April 18, 1876.

Fig. 2.

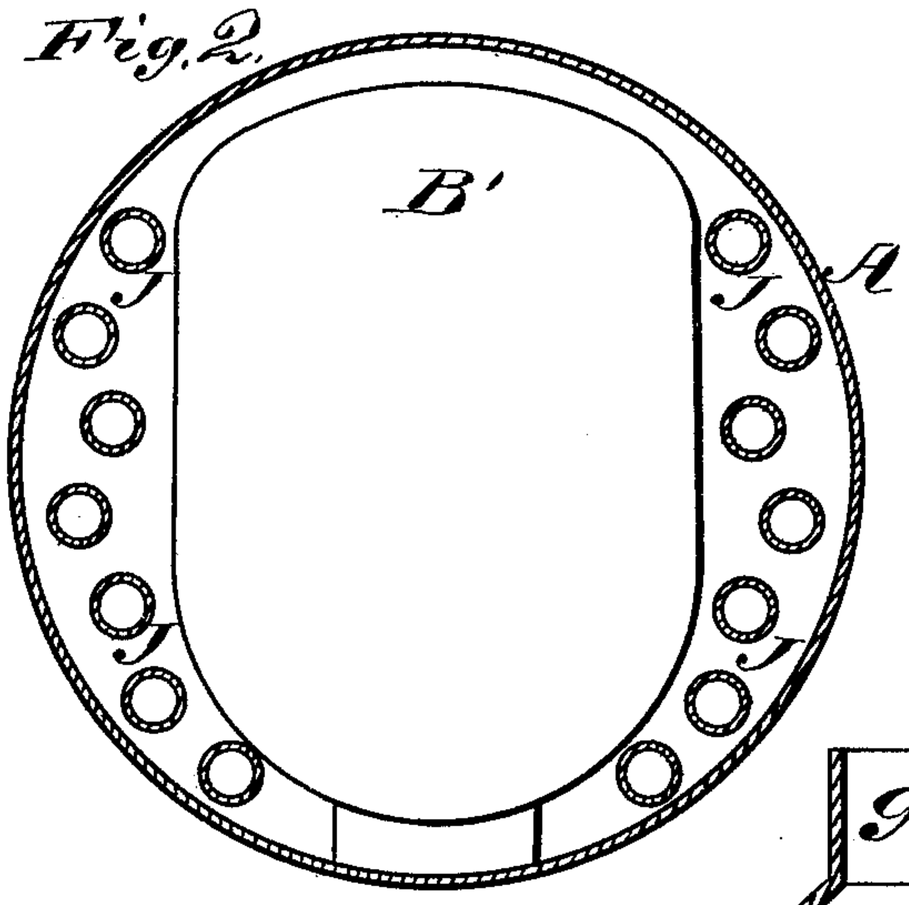


Fig. 3.

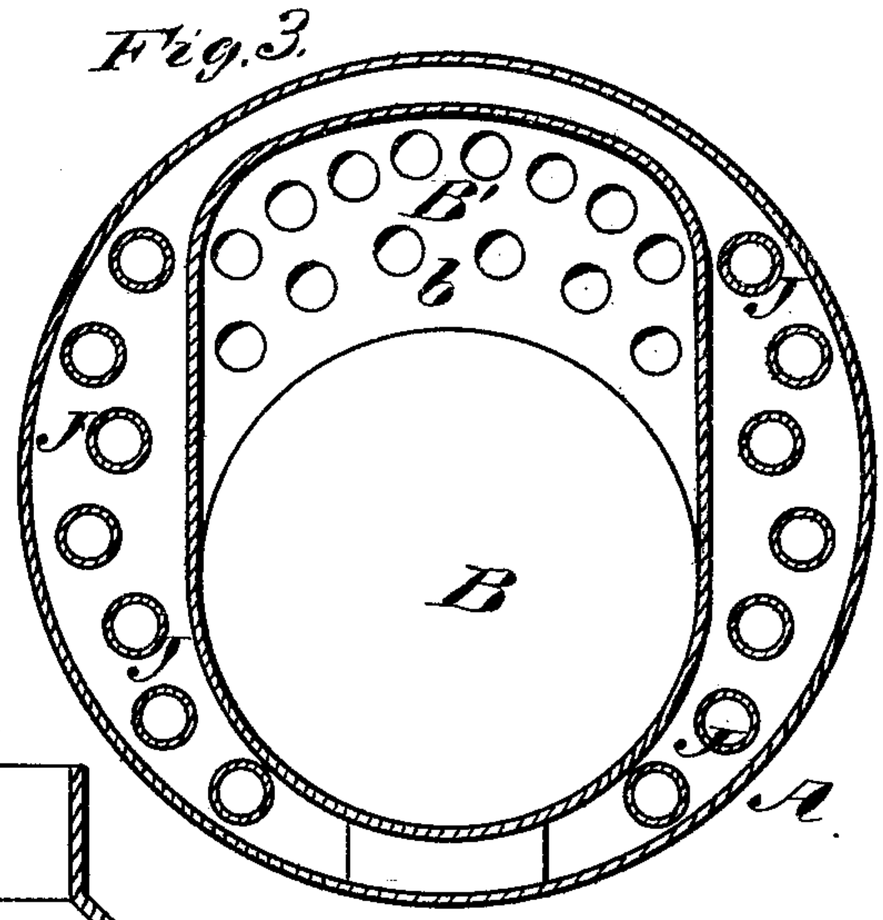
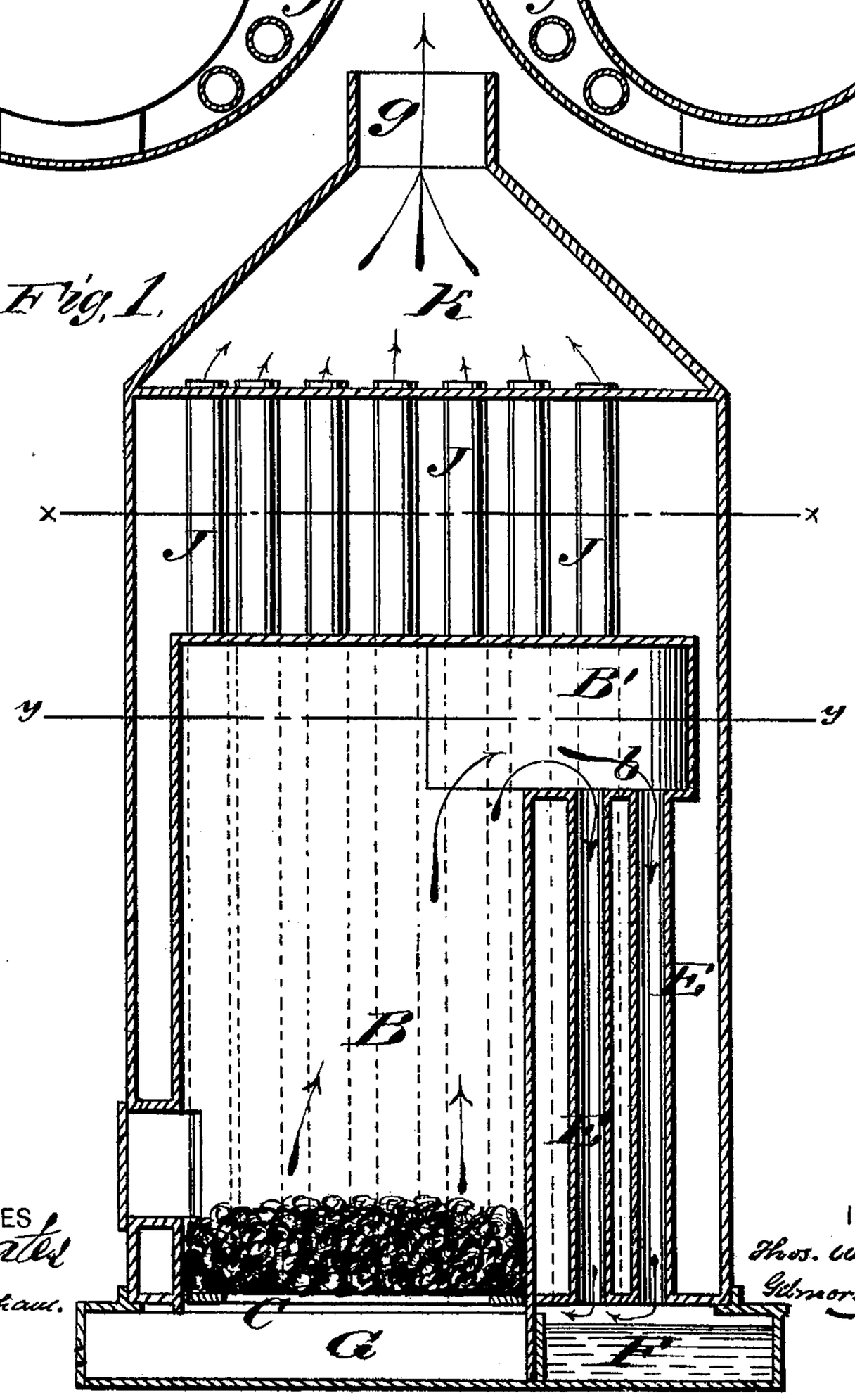


Fig. 1.



WITNESSES

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THOMAS W. GODWIN, OF NORFOLK, VIRGINIA.

IMPROVEMENT IN VERTICAL STEAM-BOILERS.

Specification forming part of Letters Patent No. **176,296**, dated April 18, 1876; application filed March 29, 1876.

To all whom it may concern:

Be it known that I, THOMAS W. GODWIN, of Norfolk, in the county of Norfolk and State of Virginia, have invented a new and valuable Improvement in Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a longitudinal vertical sectional view of my steam-boiler, and Fig. 2 is a horizontal sectional view through *x x*. Fig. 3 is a horizontal sectional view through *y y*.

This invention relates to an improvement on the boiler for which Letters Patent of the United States were granted to me, bearing date November 2, 1875, and numbered 169,434. The invention and improvement consist in an upright steam-boiler having a water-space surrounding its base, a furnace which is constructed with an offset at its upper end, on one side only thereof, and groups of descending and ascending flues, arranged as will be hereinafter explained.

In the annexed drawings, A designates the cylindrical shell of an upright steam-boiler, and B is a fire-chamber, which is also cylindrical and upright, extending from a grate, C, nearly to the flue-sheet of the ascending flues J. This fire-chamber B is arranged nearer the front part of the shell A than the rear part, as shown in the drawing, and it is constructed with a horizontal offset, B′, at its upper rear part, which is of segmental form, as shown in Figs. 2 and 3. This offset extends back nearly to the rear side of the boiler-shell, and from its bottom sheet *b* descend a group of flue-tubes, E, which enter a water-base, F, that nearly surrounds the ash-pit G. The products of combustion pass from the body of the fire-chamber B into the offset B′, and descend into the water-space F through tubes E, where the sparks are extinguished. The products of combustion ascend from the space F through flue-tubes J into a smoke-chamber, K, from which the smoke escapes through a stack or chimney, *g*. The ascending flue-tubes J are arranged in the manner shown in Figs. 2 and 3, on opposite sides of the fire-chamber B and its offset. There are no tubes J at the front and rear of the boiler-furnace; but, by the construction of the fire-chamber, as shown and described, I am able to arrange all of the diving or descending flues at the rear of the furnace or fire-chamber, and all of the ascending flues at the sides of this chamber. All of the flues spring from the top sheet of the water-base. There is a saving of metal in the construction of the fire-chamber, inasmuch as that the bottom sheet of the offset B′ can be cut from the sheet of metal of which the top plate of the fire-chamber is cut, without waste of metal.

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

The combination, in a vertical boiler, of the fire-chamber B, offset B′, tubes E, water-space F, and return-tubes J, at the sides of said fire-chamber, constructed and arranged to operate substantially as described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

THOS. W. GODWIN.

Witnesses:

JOHN F. ACKER, Jr.,

C. H. McEWEN.