J. GATES.

STEAM-BOILER.

No. 193,329. Patented July 24, 1877.

Fig. 1.

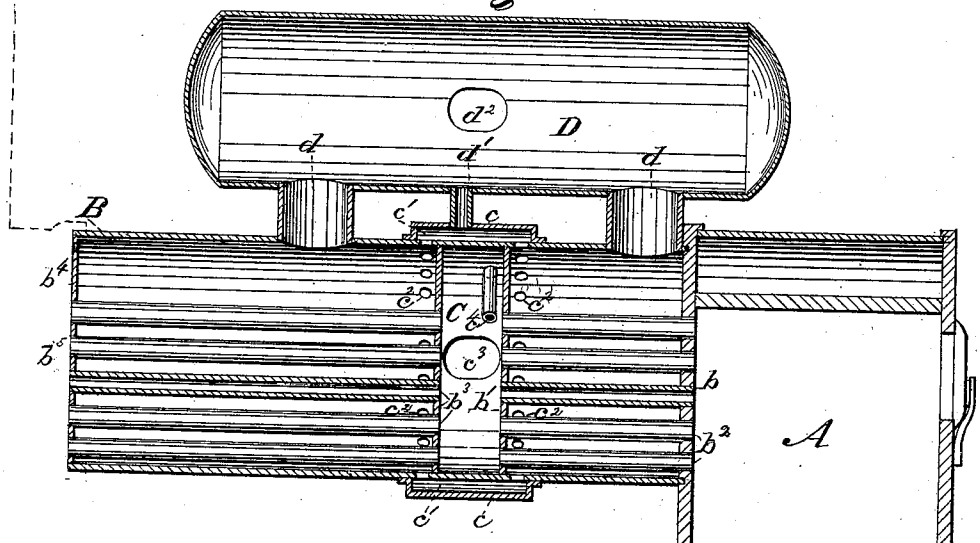
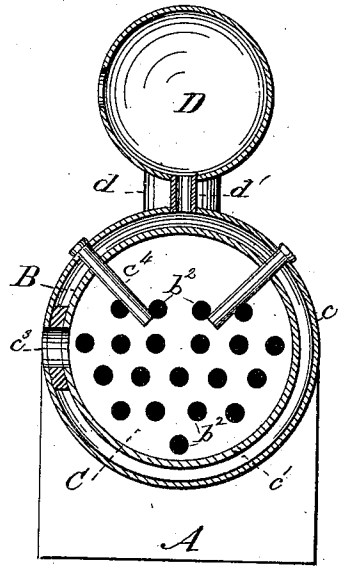


Fig. 2.



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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **193,329**, dated July 24, 1877; application filed April 13, 1877.

To all whom it may concern:

Be it known that I, JOHN GATES, of Portland, in the county of Multnomah and State of Oregon, have invented a new and useful Improvement in Steam-Boilers; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The main object of this invention is to obtain the advantages resulting from the use of long tubes or flues without the disadvantages incidental to their use; and it consists in certain details of construction, fully described hereinafter.

In the drawings, Figure 1 represents a vertical longitudinal section of my improved boiler, and Fig. 2 a transverse section through the chamber C.

To enable others skilled in the art to make and use my invention, I will now proceed to describe fully its construction and manner of operation.

A represents the fire-chamber of a steamboat flue-boiler, constructed generally in the usual well-known, or any other proper manner.

B represents the cylindrical shell of the boiler, extending its entire length from the fire-chamber to the smoke-chamber, as shown.

b b^1 represent the boiler-heads of the first section of the boiler, in which the ends of the flues b^2 are secured in the usual manner.

b^3 b^4 represent the heads of the second section of the boiler, in which also the flues b^5 are secured in the usual manner.

C represents an intermediate space or chamber formed between the adjacent ends of the sections, and c a plate or sheet inclosing the same outside of the shell, for the purpose of forming the water chamber c^1, as shown.

c^2 c^2 represent an annular series of openings through the shell of the boiler, by means of which the water and steam in the sections freely pass from one to the other.

c^3 represents a man-hole, properly formed in the chamber, and c^4 an opening for the purpose of introducing atmospheric air, if desired.

D represents a steam-drum, located over the boiler, which communicates at each end with the section below, by means of the branch pipes d d, as shown.

d^1 represents a steam-pipe, uniting the chamber c^1 to the drum, as shown.

d^2 represents a man-hole, through which ready access is obtained to the drum, when desired, and also to sections of the boiler, through the pipes d d.

The operation of this boiler does not differ materially from others of its class.

The products of combustion pass from the fire-chamber through the flues to the smoke-chamber, air being admitted into the intermediate combustion-chamber, if desired.

The water and steam generated in the sections of the boiler circulate freely through the chamber c^1. The steam rises, of course, into the drum, where it becomes superheated by the heat rising from the boiler.

The advantages arising from the described construction are very marked. That section of the boiler which is most exposed to the action of heat is made comparatively short, and, consequently, its flues are relatively less affected by expansion and contraction than if of great length. These tubes also which are most exposed to the destructive forces may be easily removed, and new ones be inserted. The other sections, being more remote from the fire, and less affected by expansion and contraction, are provided with comparatively long tubes.

By means of this construction the advantages of long tubes are obtained, without the disadvantages incidental to their use.

By means of the man-holes the interior of the boiler may be readily reached for inspecting or cleaning purposes.

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

1. In combination with the sectional boiler and chamber c^1, the drum D, and connecting-pipe d^1, as described.

2. In combination with the sections of the boiler B, having the heads b and b^1 and openings c^2 c^2, with the annular plate c, as described.

This specification signed and witnessed this 16th day of March, A. D. 1877.

JOHN GATES.

Witnesses:
LORING COES,
J. HENRY HILL.