J. HUGHES.

STEAM-BOILER.

No. 193,253. Patented July 17, 1877.

Fig. 1.

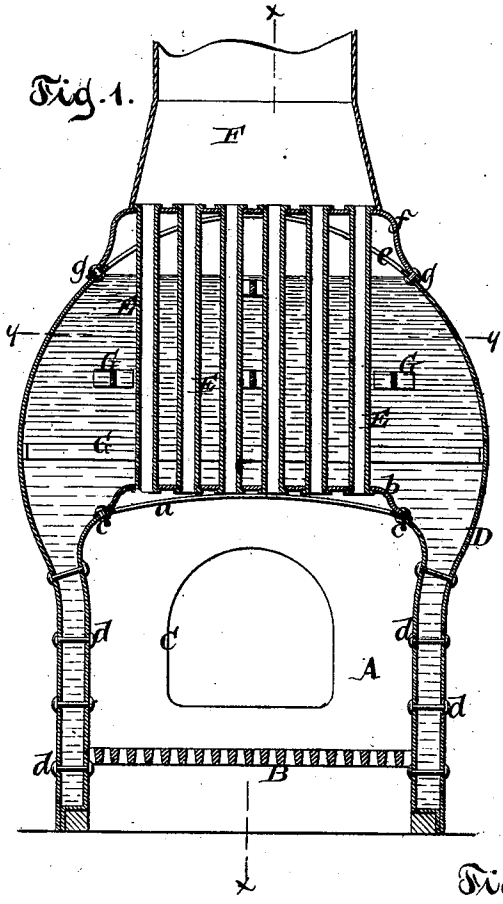


Fig. 2.

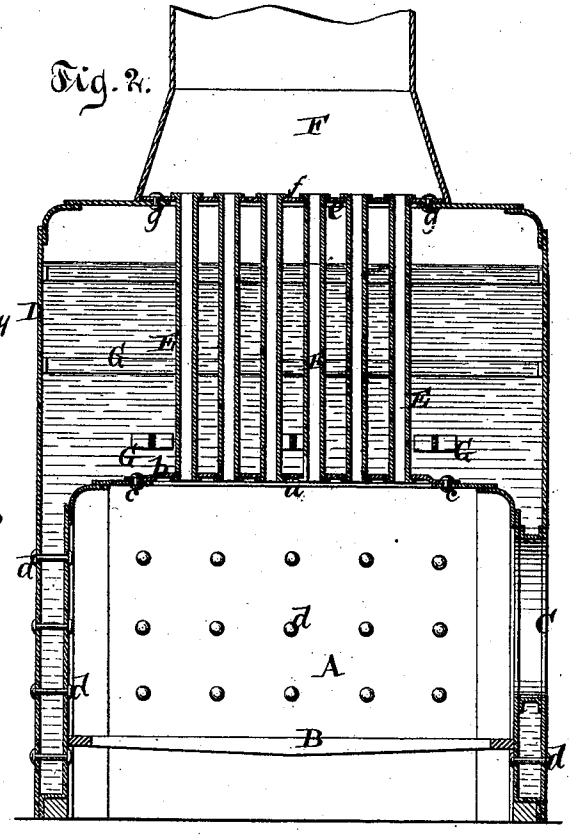
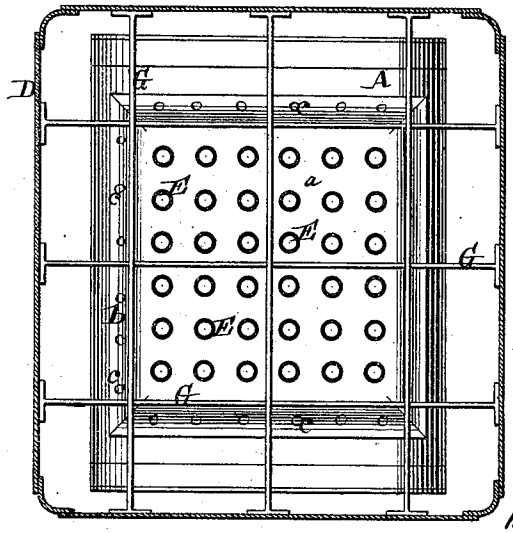


Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

JOHN HUGHES, OF NEW YORK, N. Y.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **193,253**, dated July 17, 1877; application filed June 15, 1877.

To all whom it may concern:

Be it known that I, JOHN HUGHES, of the city, county, and State of New York, have invented a new and useful Improvement in Steam-Boilers, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a transverse vertical section. Fig. 2 is a longitudinal vertical section in the plane *x x*, Fig. 1. Fig. 3 is a horizontal section in the plane *y y*, Fig. 1.

Similar letters indicate corresponding parts.

For many purposes horizontal boilers of cylindrical form, or of a form approximating thereto, are preferable, but are objectionable in some instances on account of their horizontal flues; and the object of my invention is to provide an approximately cylindrical boiler with vertical flues, thus combining the advantages of a vertical and horizontal cylindrical boiler.

To this end my invention consists in the combination, with the shell of the boiler, of a tube-sheet on the top, and a series of vertical tubes extending from the crown of the fire-box to said tube-sheet.

In the drawing, the letter A designates the fire-box of my steam-boiler. In the bottom part of this fire-box is situated the grate B, to which access is had through the fire-door C. In the convex top of said fire-box is a square, round, or oblong opening, *a*, over which extends a tube-sheet, *b*, which is secured to the convex top of the fire-box by rivets *c*.

D is the shell of my boiler, the top of which is made cylindrical, while its sides and ends extend down over the fire-box, and are connected to the same by stay-bolts *d*. In the top of said shell is an opening, *e*, corresponding in shape and size to the opening *a* in the top of the fire-box, and over this opening extends a tube-sheet, *f*, which is fastened to the convex top of the shell by rivets *g*. In the tube-sheets *b* and *f* are secured a series of vertical fire-flues, E, and over the upper tube-sheet *f* is placed the smoke-stack F.

It will be seen from this description that the fire-box, as well as the fire-flues, are surrounded by water, and consequently a very extensive heating-surface is obtained in a boiler of comparatively small dimensions. The shell D is strengthened by a series of braces, G, as shown in the drawing.

My boiler requires very little room. It can easily be kept clean, and it is capable of generating steam very rapidly, and with great economy in fuel. It can be used with great advantage for stationary engines, and also for fire-engines, where a rapid generation of steam is particularly desirable.

By means of the tube-sheets *b* and *f* the tops of the fire-box and of the shell are strengthened, and my boiler is enabled to sustain a considerable pressure.

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

The combination, with the shell of a cylindrical boiler, of the tube-sheet secured to said shell, and a series of vertical tubes extending from the crown of the fire-box to said tube-sheet, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand and seal this 12th day of June, A. D. 1877.

JOHN HUGHES. [L. S.]

Witnesses:

W. HAUFF,

CHAS. WAHLERS.