2 Sheets—Sheet 1.

G. S. DUBOIS.

Steam Boiler.

No. 109,883. Patented Dec. 6, 1870.

Fig. 2

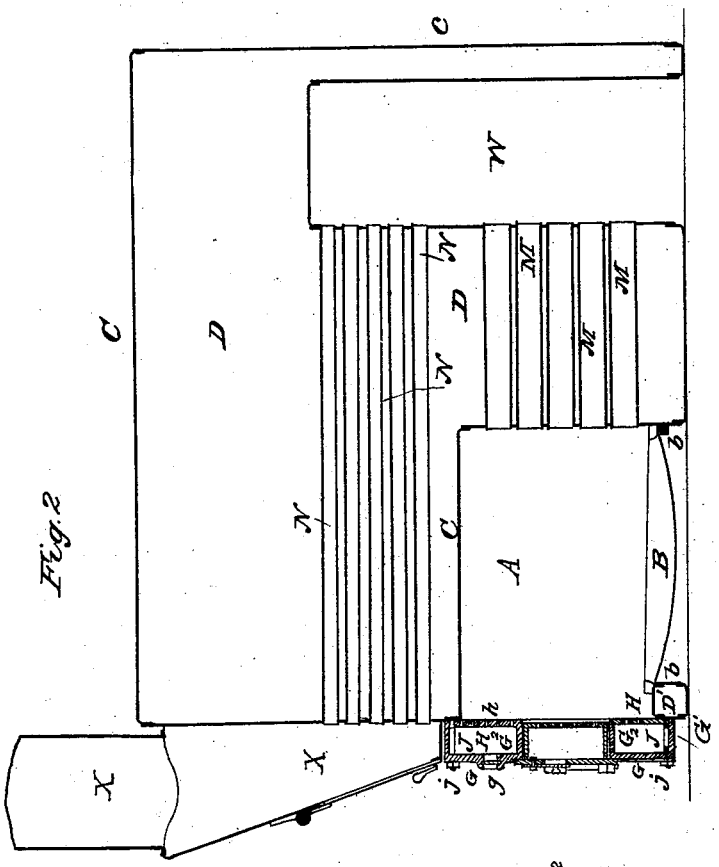
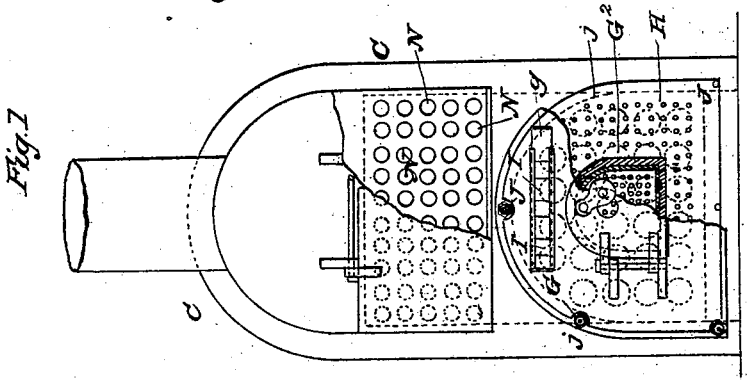


Fig. 1



Witnesses
A. Hoermann.
C. C. Livirod

Inventor
G. S. Dubois

N. PETERS, Photo-Lithographer, Washington, D. C.

G. S. Dubois,

2 Sheets, Sheet 2.

Steam Boiler Furnace.

No. 109,883. Patented Dec. 6. 1870.

Fig. 1.

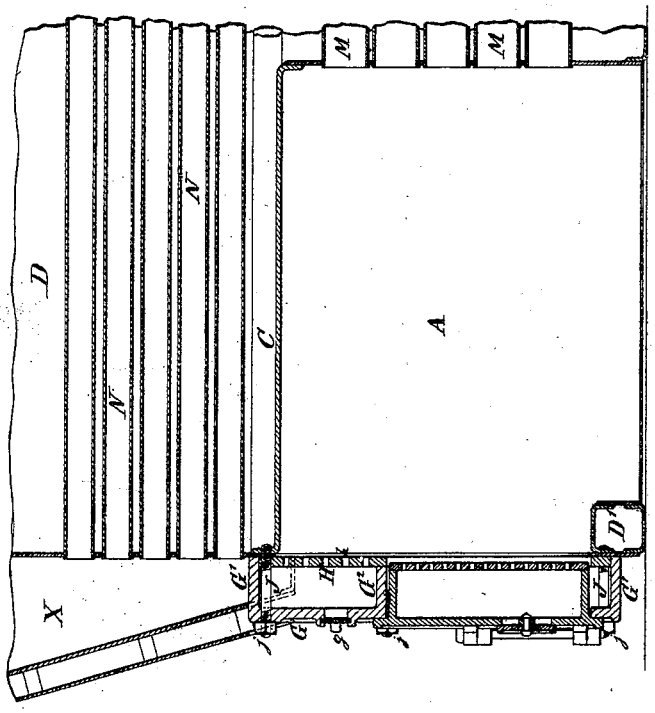
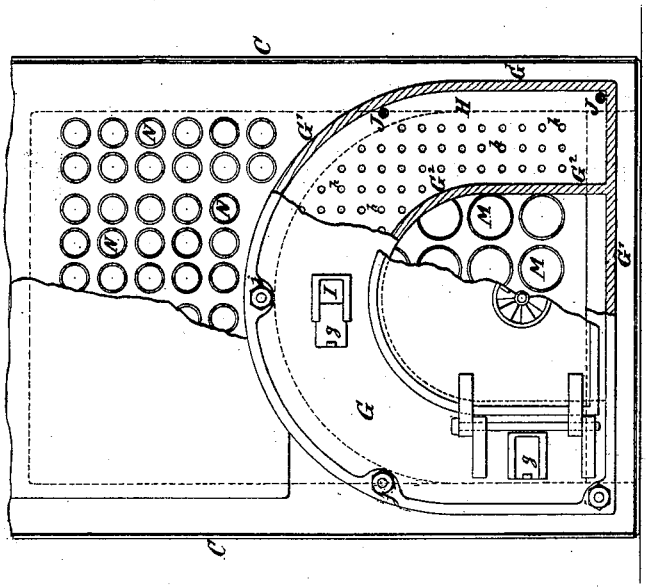


Fig. 3.



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A. Hoermann.

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Inventor,

G. S. Dubois

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

United States Patent Office.

GEORGE S. DUBOIS, OF JERSEY CITY, NEW JERSEY.

Letters Patent No. 109,883, dated December 6, 1870.

IMPROVEMENT IN STEAM-BOILERS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, GEORGE S. DUBOIS, of Jersey City, in the State of New Jersey, engineer of the steamship Emily B. Souder, have invented certain new and useful Improvements in Steam-Boilers; and I do hereby declare that the following is a full and exact description thereof.

My invention relates to the fronts of boilers having internal furnaces. Instead of a small door through a water front I make a double front removable, and provide means for efficiently cooling it and distributing in the furnace a controllable quantity of heated air in small streams distributed over the entire furnace.

My front renders it easy to introduce tubes in relations and positions where they have not before been practicable.

A portion of my invention relates to the arrangement of tubes relatively to my peculiar front.

I will proceed to describe what I consider the best means of carrying out my invention.

The accompanying drawing forms a part of this specification.

Figure 1 is a front view of the entire boiler, with certain portions broken, as will be easily understood, to show the construction;

Figure 2 is a central longitudinal section through the same;

Figure 3 is a front view of a modification on a larger scale; and

Figure 4 is a section of the same.

Similar letters of reference indicate corresponding parts in all the figures.

A is the furnace, and

B, the grate-bars, which are supported on bearers *b*.

The stout iron casing which forms the body of the boiler, and also the inclosure of the furnace, is indicated by C.

D represents the main interior of the boiler, and

D′, a water-bar extending across the base of the front and connecting the two side legs.

It will be understood that the boiler is provided with hand-holes at each side of the front, to allow the removal of mud or other deposit, and a thorough washing through the front bar as often as may be necessary, according to the foulness of the water used.

The principal plates which form my front are preferably of cast-iron, and are represented by G and H.

G is an outside plate, cast with a deep offset around the edge, marked G^1.

It has large apertures, controlled by one or more sliding valves or registers, *g*, to control the admission of air to the space between G and H.

The inner plate H is thickly perforated with small holes *h*, through which the air admitted through the large holes I, and which becomes more or less heated by traversing between the plates G and H, enters the furnace in small streams, and its heated condition facilitates the combination of the oxygen with the combustible gases.

The aperture for the door is of the usual size, or it may be a little smaller. It is inclosed within a flange, G^2, which is fast upon the outer flange, G.

The door may be of any ordinary or suitable construction, but I prefer the analogous construction, that is to say, the employment of two plates, the outer one having one or more large apertures, and the inner one a great number of small ones.

My entire front is held to the boiler by bolts J and nuts *j*. On removing these nuts *j* the entire front can be taken away to allow access to the interior of the furnace.

The removal of the entire front in this manner allows repairs in the interior of the furnace, and the introduction and removal of flue-sheets, tube-sheets, and tubes, with a facility which has not before been enjoyed in boilers of this class.

It has long been common to make doors of furnaces with perforated plates on their inner faces to distribute small streams in the fire, and various devices, such as hollow stays, double tubes connected by hollow stays, with water between, and the like, have been employed to introduce heated air properly divided into the furnace; but I am not aware that any one has before combined these advantages in a removable front covering the entire end of the furnace, and capable of serving with the furnace, and with the other portions of the boiler, like mine.

I consider the water-bar D′ a feature of great importance in preparing the boiler to receive my front and holding it firmly and properly in place, and also in connecting the sides or water-legs of the boiler. In the absence of such a water-bar the legs are liable to spread under the pressure and heat in the furnace. The spreading I consider to be partially due to the strains received from the pressure through imperfect staying, and partly to the increased expansion of the inner work or furnace over that of the outer work or shell when subjected to an intense fire.

I have represented the front as made with the flanges G^1 G^2 cast upon the outer plate G. One or both of these flanges may be cast on the inner plate H, and the forms of the front may be modified to suit various forms of furnaces. The means of attaching and disconnecting may be varied by the employment of bolts taking hold of the flanges at the extreme

dge, instead of going through the space between G^1 nd H, if preferred.

I believe it to be practicable to construct my front ubstantially of two plates of good boiler-iron, turn- ng and bending the flanges G^1 G^2, or the equivalent neans, for properly controlling and directing the mo- ion of the air. So the slide or register which gov- rns the influx of air through the outer plate G may e modified in various ways. I esteem it, however, ssential that the means be cheap and reliable, and asy to operate, requiring only a moderate degree of kill in the attendant.

I claim—

1. The furnace front herein described, covering the entire area of the furnace A, and provided with means for admitting and controlling the admission of air, as specified.

2. The open-front furnace A, constructed as specified, with a water-bar, D', connecting the water-legs, and adapted to receive and to serve with my removable front G H and its connections, as herein specified.

In testimony whereof, I have hereunto set my name in presence of two subscribing witnesses.

G. S. DUBOIS.

Witnesses:

C. C. LIVINGS,

A. HOERMANN.