(No Model.) 3 Sheets—Sheet 1.

J. H. BLANCHARD & F. A. JONES.

STEAM BOILER OR OTHER FURNACES.

No. 343,531. Patented June 8, 1886.

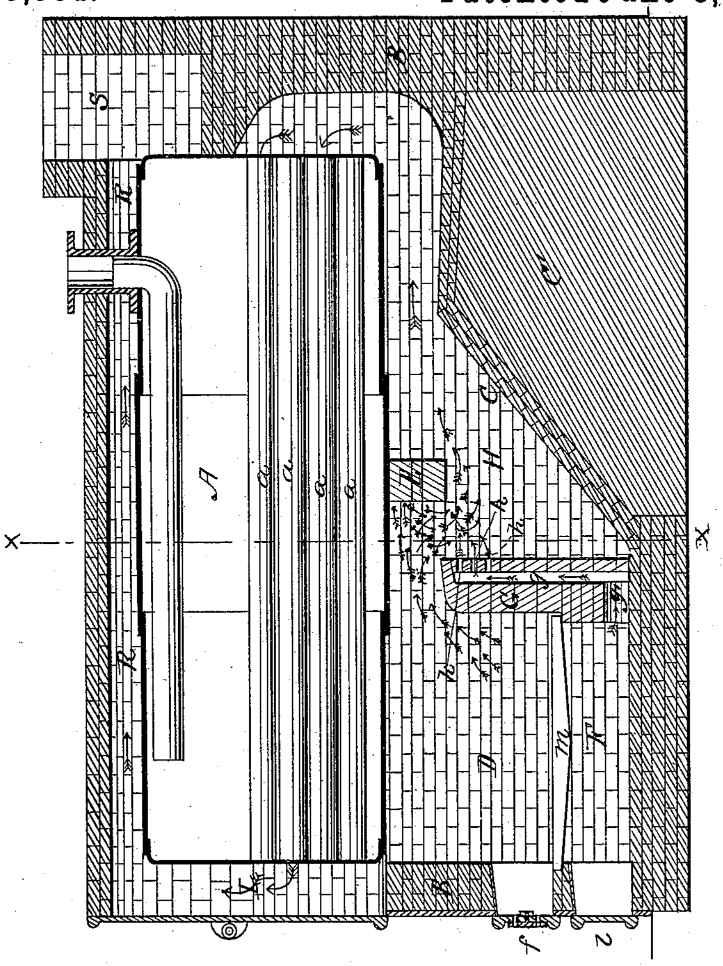


FIG. 1.

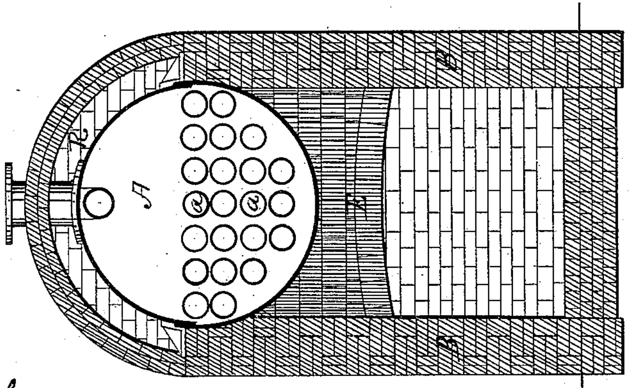


FIG. 2.

WITNESSES

M. W. Frothingham.

John F. Wakefield

INVENTORS

John H. Blanchard

Florentine A. Jones

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

(No Model.) 3 Sheets—Sheet 2.

J. H. BLANCHARD & F. A. JONES.

STEAM BOILER OR OTHER FURNACES.

No. 343,531. Patented June 8, 1886.

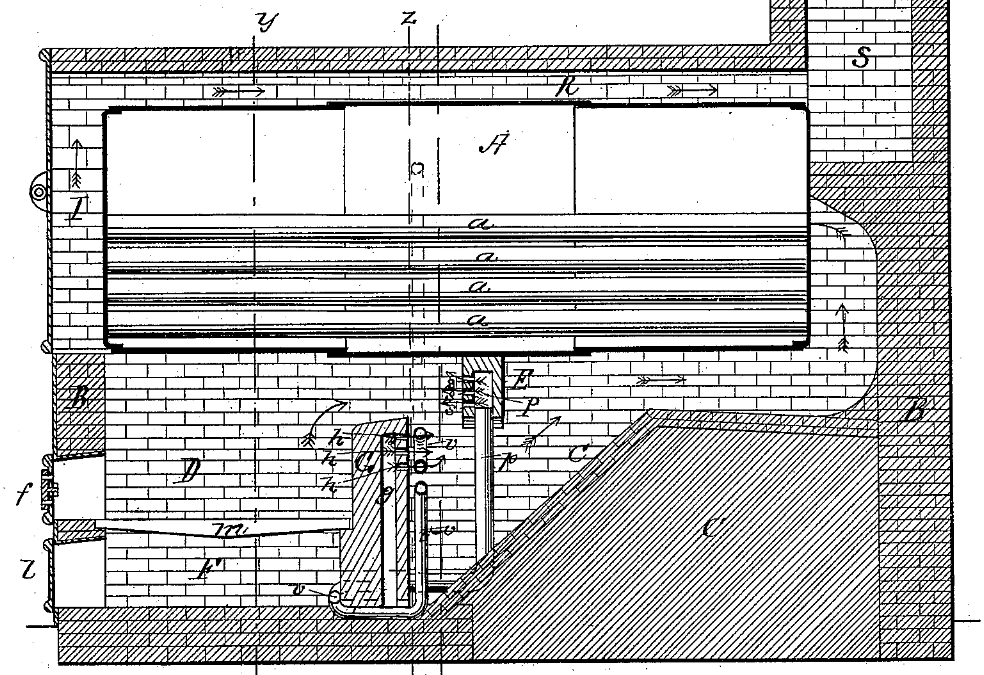


Fig. 3.

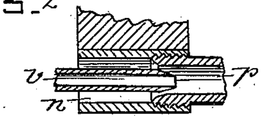
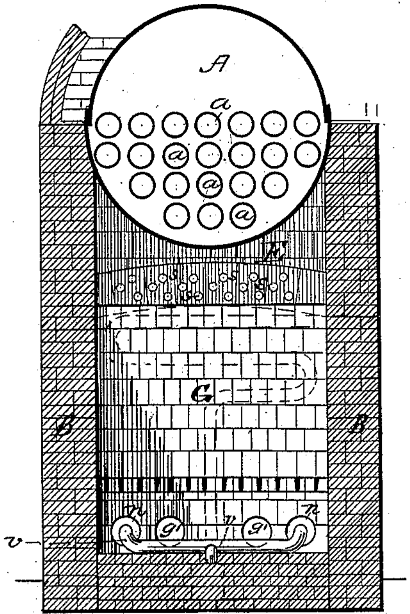
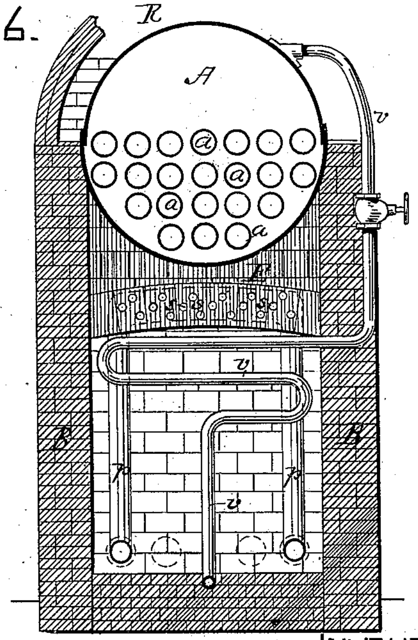


Fig. 6.





WITNESSES

M. W. Frothingham.

John F. Wakefield

Fig. 4.

Fig. 5.

INVENTORS

John H. Blanchard

Florentine A. Jones.

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

(No Model.) 3 Sheets—Sheet 3.

J. H. BLANCHARD & F. A. JONES.

STEAM BOILER OR OTHER FURNACES.

No. 343,531. Patented June 8, 1886.

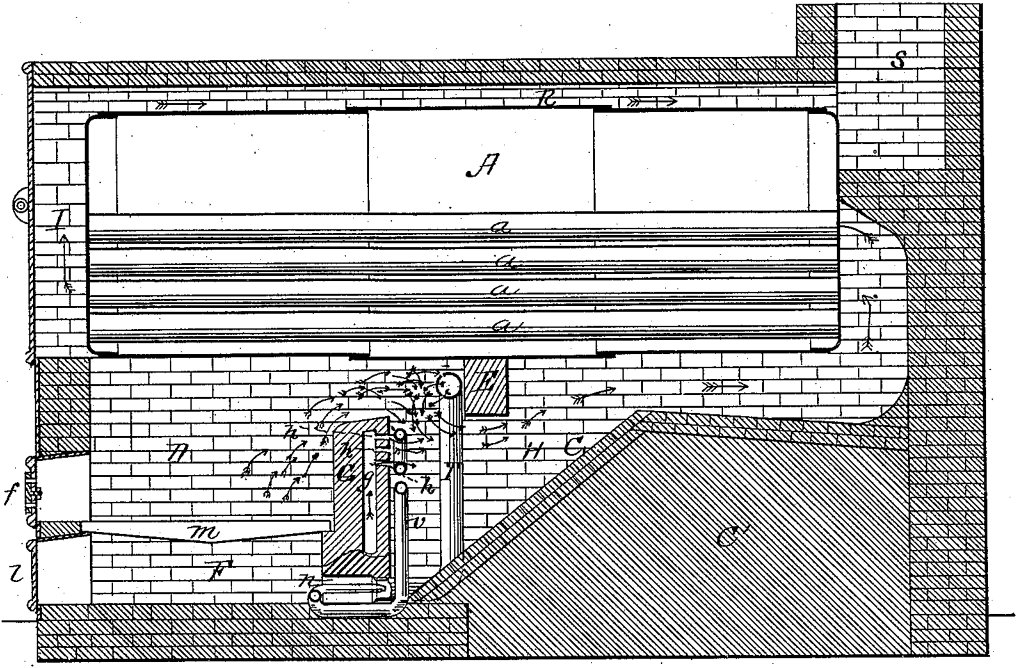


Fig. 7.

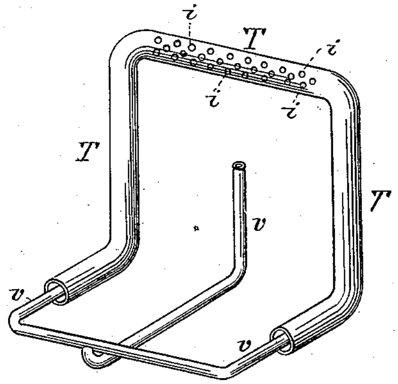


Fig. 8.

WITNESSES

M. W. Frothingham.

John F. Wakefield

INVENTORS.

John H. Blanchard

Florentine A Jones

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

UNITED STATES PATENT OFFICE.

JOHN H. BLANCHARD, OF BOSTON, AND FLORENTINE A. JONES, OF MALDEN,
MASSACHUSETTS; SAID BLANCHARD ASSIGNOR TO SAID JONES.

STEAM-BOILER OR OTHER FURNACE.

SPECIFICATION forming part of Letters Patent No. 343,531, dated June 8, 1886.

Application filed February 18, 1886. Serial No. 192,394. (No model.)

To all whom it may concern:

Be it known that we, JOHN H. BLANCHARD and FLORENTINE A. JONES, citizens of the United States, residing, respectively, at Boston, in the county of Suffolk, and at Malden, in the county of Middlesex, all in the State of Massachusetts, have invented certain new and useful Improvements in Steam-Boiler and other Furnaces, of which the following is a specification.

Our invention relates to steam-boiler and other furnaces.

The object of this invention is to insure a more complete and perfect combustion of the fuel, and of the resulting gaseous products.

Our invention consists in momentarily arresting or detaining and deflecting the heat and gaseous products of combustion after they have passed over and beyond the fuel, and beyond the bridge-wall or partition which defines that portion of the furnace underneath the grate; and it further consists in the introduction of air or steam, or both, at a certain point or points, whereby we obtain a more thorough intermixing of this supplementary supply of air and steam with the gaseous products of combustion than has heretofore been achieved, and in consequence a more perfect and economical combustion of the fuel; and we accomplish this result by means of an obstruction, preferably in the form of a hanging wall, which may also be perforated, substantially as shown, and which is placed a proper distance beyond the bed of fuel and its attendant bridge-wall (so called) in the usual coal-burning steam-boiler furnace shown in the drawings; but in furnaces not employing a bridge-wall the end of the bed of fuel or a substitute for the bridge-wall may be used, in order that the products of combustion may be brought in contact with the hanging wall and deflected from their natural course in passing off.

It may be proper to say that we make use of a hanging wall, and show such in the drawings, because we consider it preferable to a wall supported from the under side; but it will be understood that such a wall, or of iron or any proper substitute, in place of the hanging wall shown, would come within the scope of this invention.

We are aware that both air and steam have been supplementarily admitted to furnaces at different points and in different manners; but we are not aware of its having been done in the manner or more particularly under the conditions that we have herein set forth and by which we are enabled to achieve a result hitherto unattained.

In the accompanying drawings, in which similar letters of reference indicate like parts, the form of boiler shown is the usual form of tubular boiler and setting, wherein heat is applied to the outside of the shell on the under side, the fire-box being situated under the front end of the boiler, and the heat and products of combustion passing to the rear of the boiler, then returning to the front through a series of tubes, which traverse the boiler longitudinally, and pass off through the uptake and flue into the chimney.

Figure 1 is a longitudinal vertical section of our improved boiler-furnace. Fig. 2 is a cross vertical section on line x x of Fig. 1, showing the hanging wall E. Fig. 3 is a longitudinal vertical section showing our improved boiler-furnace with a hollow hanging wall, E, and its supply-pipe p and the steam-pipe v. Fig. 4 is a cross vertical section on line y y, showing the steam-pipe v and openings n n in the front of the bridge-wall, and openings g' g', which connect with the chamber g in the bridge-wall. Fig. 5 is a cross vertical section on line z z, showing the front of the hollow hanging wall E and its supply-pipe p and steam-pipe v in the rear of the bridge-wall. Fig. 6 is a detail showing connection of steam-pipe v with the supply-pipe p. Fig. 7 is a longitudinal vertical section showing a perforated pipe, T, used with the hanging wall E instead of the hollow chamber P shown in Fig. 3. A portion of the bridge-wall is also broken out to show the connection between the steam-pipe v and the perforated pipe T. Fig. 8 is a perspective view of the perforated pipe T and steam-pipe v.

A represents the boiler; a a a, the tubes; B, the brick-work.

C is an inclined wall; C′, the filling; D, the fire-box; m, the grate-surface; F, the ash-pit; G, the bridge-wall provided with the chamber *g*, receiving air at *g'* and discharging it through the openings *h h h* into the combustion-chamber H.

f is the door to the fire-box, and *l* is the door under the grate opening into the ash-pit.

I is the uptake; K, the flue.

S is the chimney.

E is a hanging wall, which retards and deflects the products of combustion, causing them to pass downward and in contact with the air coming from the openings *h h h*, near the top of the bridge-wall G, and causing the combustion of the gaseous products arising from the fuel, and resulting in a great increase of heat which would otherwise be lost from the gaseous products passing off unconsumed.

It will readily be seen that a small pipe from the steam-space arranged to enter the opening *g'* would enable one to inject steam as well as air into the current of products through the perforations *h h h*.

Fig. 3 shows the hanging wall E, provided with perforations *s s s*, and the chamber P, with which the pipes *p* connect, that pass downward and connect with the openings *n* through the bridge-wall to the ash-pit, as shown in Figs. 4 and 5, which also show the pipe *v*, leading from the steam-space of the boiler A downward in the rear of the bridge-wall G, where it makes a turn or more, for the purpose of superheating the steam, and then comes through the bridge-wall into the ash-pit F, where it is connected with the openings *n n*, as shown in Figs. 4 and 6, and pipes *p* and chamber P in the hanging wall E, as shown in Figs. 5 and 3.

Fig. 7 is a modification showing the use of the perforated pipe T instead of the chamber P in the hanging wall E of Fig. 3, this pipe T having the same connections and performing the same functions as the chamber P.

The inclined wall C is an important factor in our invention, inasmuch as it is desirable to facilitate the passage of the intense heat generated at or near the hanging wall E to the rear of the furnace and into the tubes *a* as quickly as possible.

In short, the theory of this invention is to retard the escape of the combustible products until their combustion has been accomplished, and then to facilitate the passage of the resultant heat under the boiler and through the tubes.

Having thus fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In combination with a furnace, a hollow wall provided with perforations extending from the interior outward through the side opposing the draft, said wall being so situated and constructed as to arrest and deflect the products of combustion downward and under said wall after they have passed over the bed of fuel, substantially as and for the purpose set forth.

2. In combination with a furnace having a hollow bridge-wall provided with perforations on its rear side, a hollow wall provided with perforations extending from the interior outward through the side opposing the draft, said wall being so situated and constructed as to arrest and deflect the products of combustion downward and under said wall after they have passed over the bed of fuel, substantially as and for the purpose set forth.

3. In combination with a furnace and a wall so situated and constructed as to arrest and deflect the products of combustion downward and under said wall after they have passed over the bed of fuel, a flue or pipe for the purpose of supplying air or steam to said products through perforations in said wall which extend from the interior through the side opposing the draft, or through perforations in said pipe extending across the furnace at right angles with the draft in front of said wall and in the rear of the bridge-wall, substantially as and for the purpose set forth.

JOHN H. BLANCHARD.
FLORENTINE A. JONES.

Witnesses:
M. W. FROTHINGHAM,
JOHN F. WAKEFIELD.