

(No Model.)

5 Sheets—Sheet 1.

F. A. JONES.

STEAM BOILER OR OTHER FURNACE.

No. 360,887.

Patented Apr. 12, 1887.

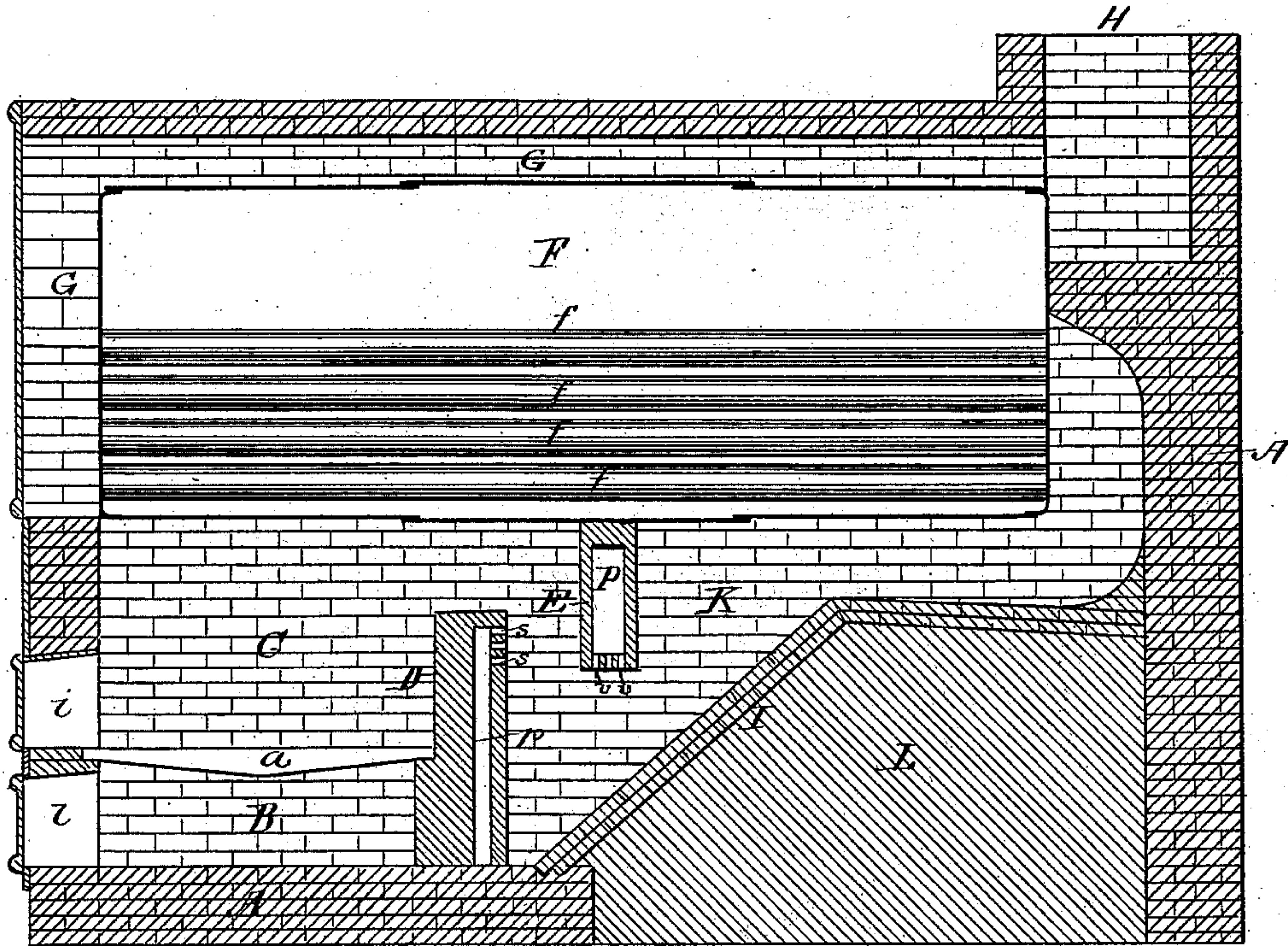


FIG. 1.

WITNESSES.

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*John F. Wakefield*

INVENTOR.

*Florentine A. Jones.*



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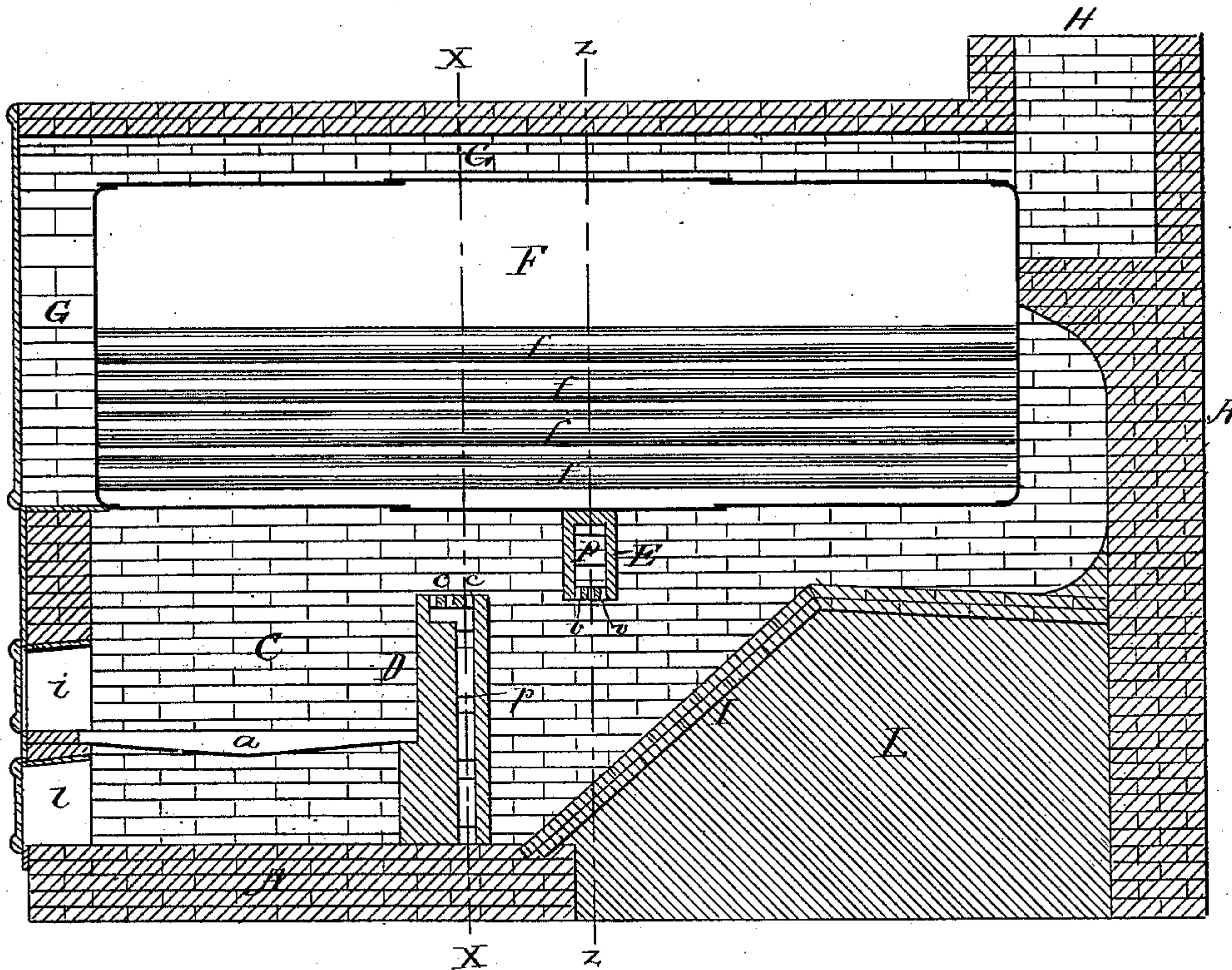
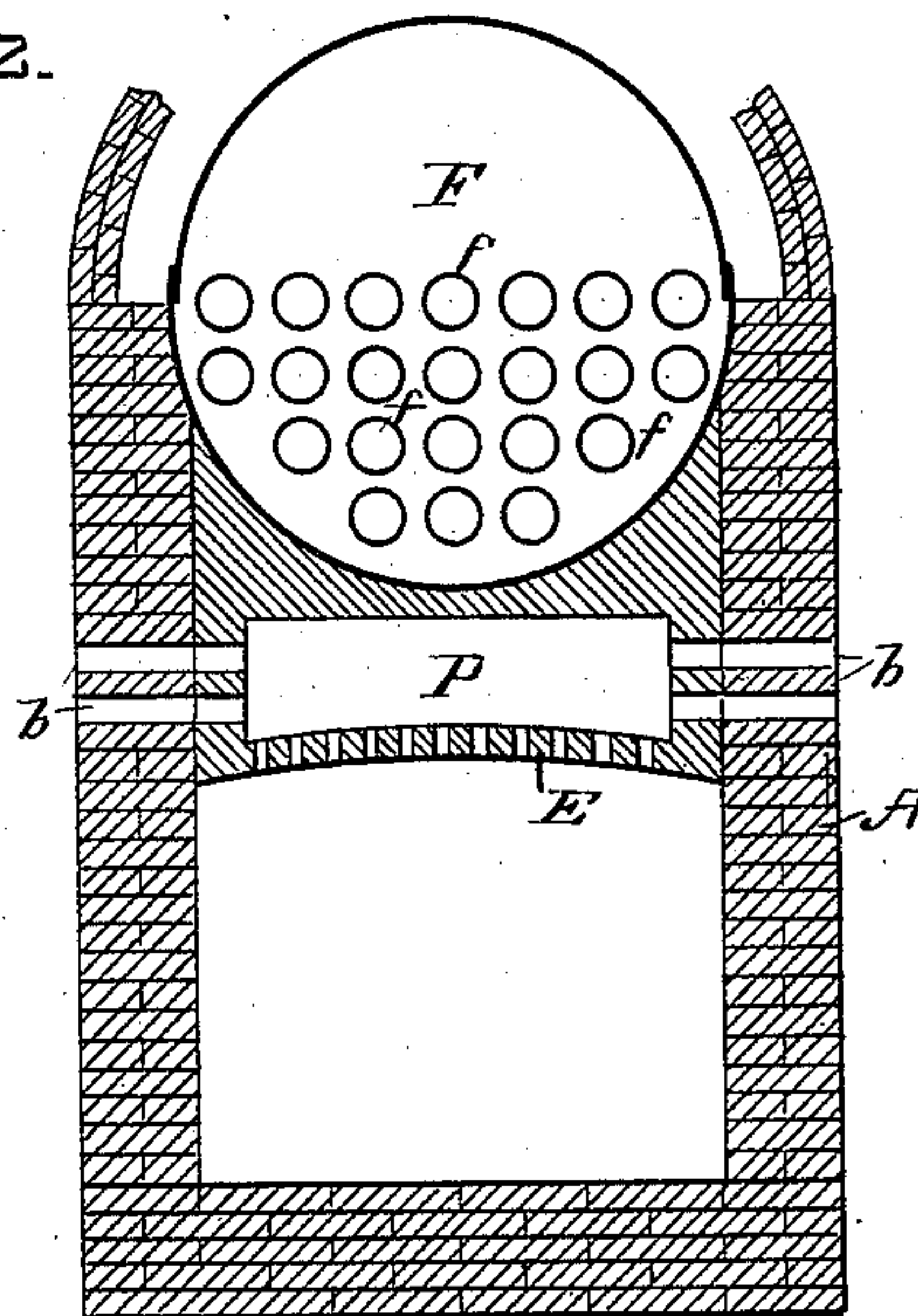
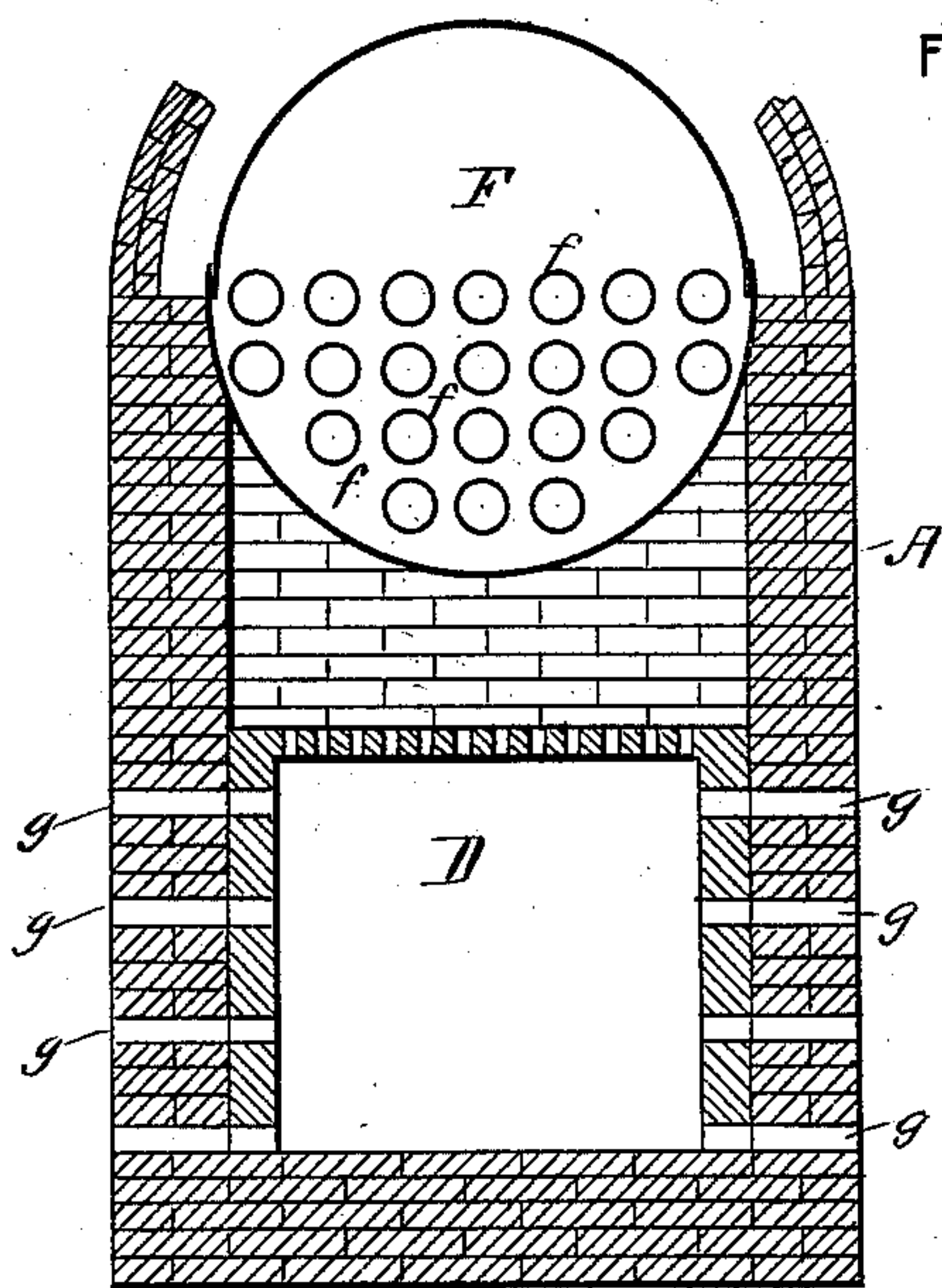


Fig. 2.



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Fig. 5.

INVENTOR.

Fig-4.

Florentine A Jones.



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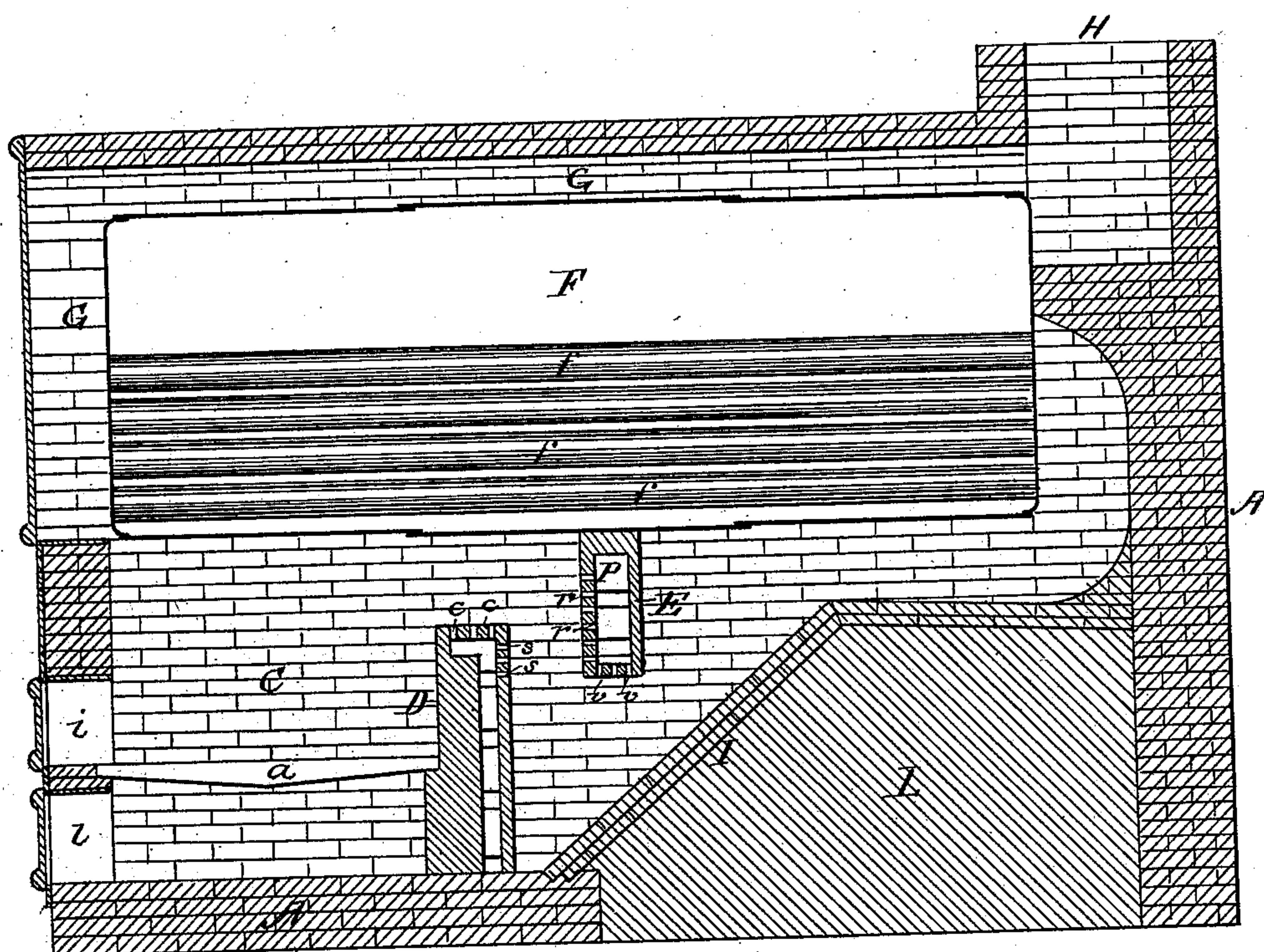


Fig. 5.

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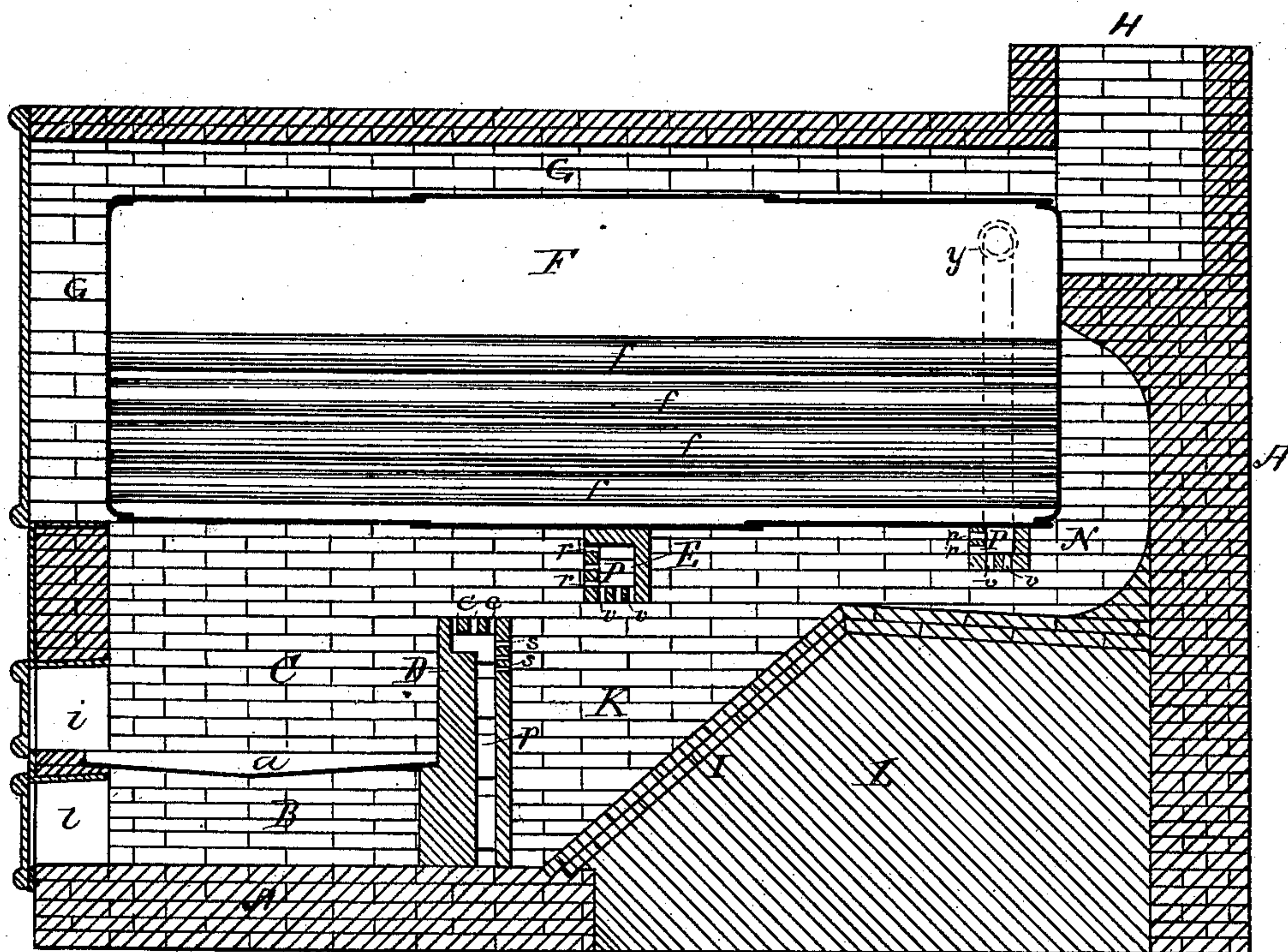


FIG. 6.

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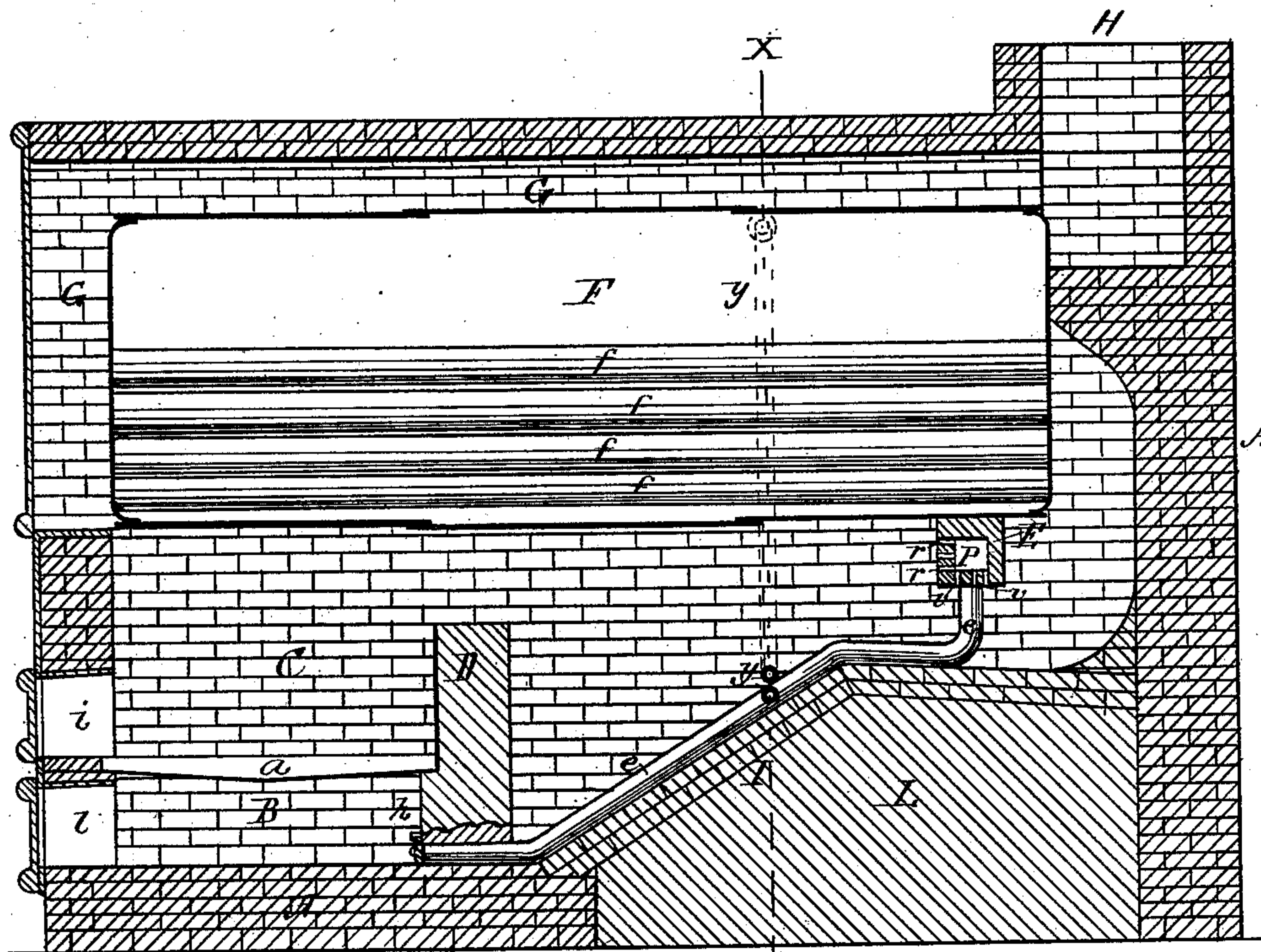


Fig. 7-

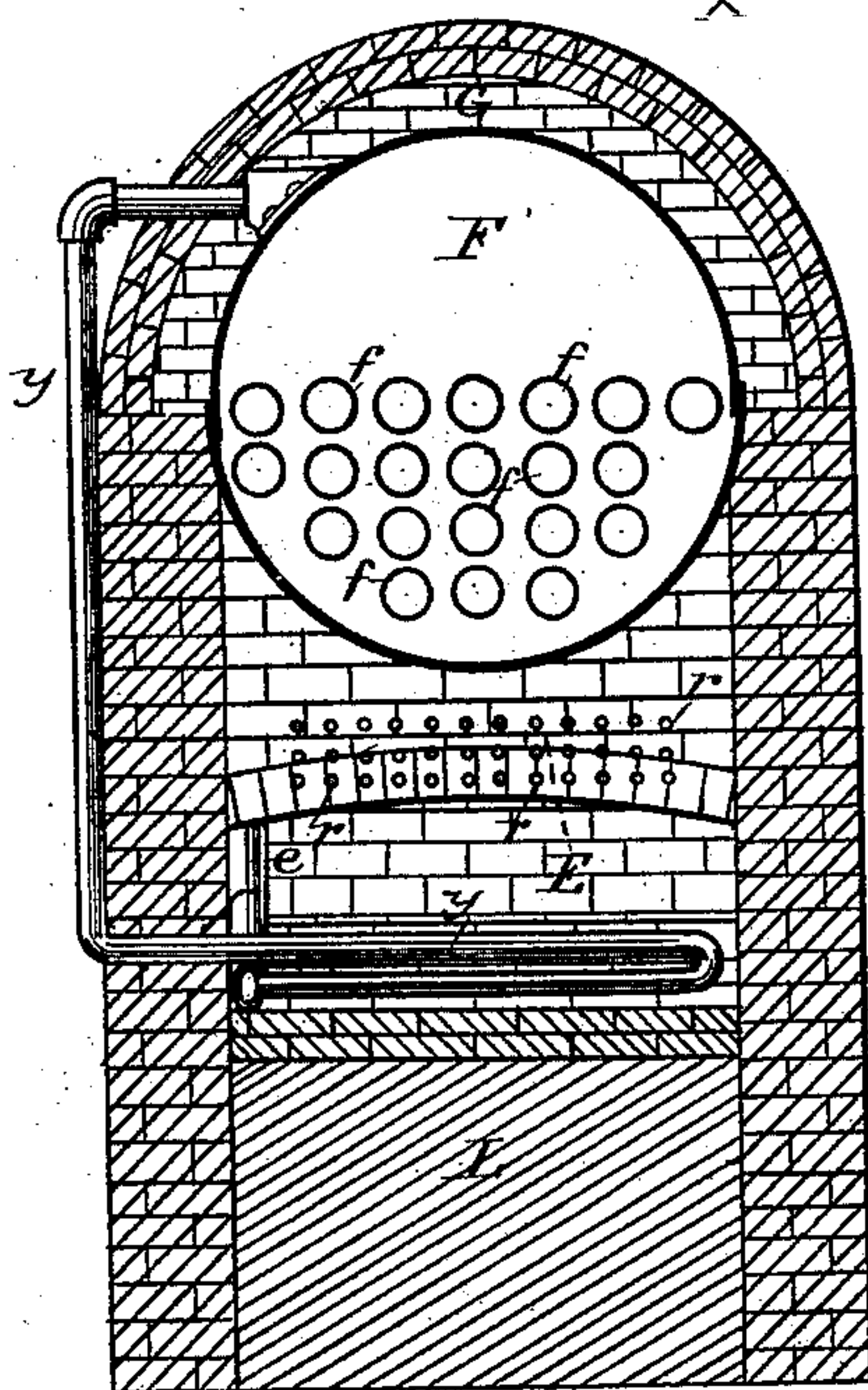


Fig. 2.

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 John F. Wallfield

INVENTOR-

Florentine  
A  
Garap.



# UNITED STATES PATENT OFFICE.

FLORENTINE A. JONES, OF MALDEN, MASSACHUSETTS.

## STEAM-BOILER OR OTHER FURNACE.

SPECIFICATION forming part of Letters Patent No. 360,887, dated April 12, 1887.

Application filed June 16, 1886. Serial No. 205,353. (No model.)

*To all whom it may concern:*

Be it known that I, FLORENTINE A. JONES, a citizen of the United States, residing at Malden, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Steam-Boiler or other Furnaces, of which the following is a specification.

My invention relates to steam-boiler or 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.

My invention consists in momentarily arresting or detaining and deflecting the heat and 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 I 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 I accomplish this result by means of an obstruction, preferably in the form of a hanging wall 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 deflected and made to pass under the lower edge or bottom side of said wall or obstruction.

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

I am aware that both air and steam have been supplementarily admitted to furnaces at different points and in different manners; but

I am not aware of its having been done in the manner, or, more particularly, under the conditions, that I have herein set forth, and by which I am 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 a boiler and furnace, showing my improvements therein. Fig. 2 is a longitudinal vertical section of a boiler and furnace, showing my improvements therein. Fig. 3 is a cross-section of Fig. 2 on line *x x*, showing passages *g* for the admission of air into the bridge-wall *D*. Fig. 4 is a cross-section of Fig. 2 on line *z z*, showing passages *b* for the admission of air into the hanging wall *E*. Fig. 5 is a longitudinal vertical section of a boiler and furnace embodying my improvements, showing perforations or passages *c c* through the top and *s s* through the rear side of the bridge-wall, with the hanging wall *E*, provided with perforations *v v* on the under side and *r r* on the front or draft-opposing side. Fig. 6 is a longitudinal vertical section of a boiler-furnace embodying my improvements and showing two hanging walls, *E* and *N*, with a steam-pipe, *y*, connecting with the wall *N*, which is perforated at *v v* and *r r*. Fig. 7 is a longitudinal vertical section of a boiler-furnace, showing the deflecting-wall *E* placed farther in the rear of the bridge-wall and supplied with heated air and superheated steam by the flue *e* and pipe *y*. Fig. 8 is a cross-section of Fig. 7 on line *x x*, showing pipe *y* arranged to superheat steam and its connection with the hot-air flue *e*.

*F* represents the boiler, *f f f* the tubes, and *A* the setting or brick-work; *i*, the door to the fire-chamber, and *l* the door to the ash-pit. *B* is the ash-pit; *a*, the grate-surface; *C*, the fire-



chamber; D, the bridge-wall; K, the combustion-chamber; I, an inclined wall, and L the filling. G is the uptake or flue, and H the chimney.

5 In the drawings showing the bridge-wall provided with the air-chamber *p*, passages for the entrance of air are shown at *g* in Fig. 3.

E is a hanging wall or obstruction placed in the rear of the bed of fuel at any convenient point, and provided with a hollow space or chamber, P, and perforations *v v* through the bottom or lower side, and in Fig. 5 the wall E is shown with additional perforations, *r r*, on the front or side opposing the draft, 15 while in the same figure the bridge-wall will be seen provided with perforations in the rear at *s s* and on the top at *c c*, these perforations connecting with the chamber *p* in said wall. The connection of the chamber P in the wall 20 E with air-supplying passages is shown in Fig. 4 at *b*.

In Figs. 6, 7, and 8, where a deflecting-wall is shown at or near the rear end of the boiler, it will be seen special means have been taken 25 for the admission of heated air or steam, or both; and Fig. 8 shows how steam may be superheated.

The operation of my improved furnace is as follows: The products of combustion arising 30 from the fuel on the grates *a* in the fire-chamber C pass with the draft over the bridge-wall D, and are arrested and made to pass under the lower side of the hanging wall E, where they come in contact with air or steam coming 35 through the perforations *v v* in the lower side of said wall E, and passing through the combustion-chamber K to the rear of the boiler F, and thence through the tubes *f f f* into the flue or uptake G into the chimney H.

40 It will be observed that in perforating the retarding-wall E on its under side the products of combustion are forcibly made to pass in contact with the air coming through the perforations *v v*, and its importance will be readily 45 understood.

The supply of air to the chamber P in the wall E should be greater than can pass through the perforations, which should be so constructed as to discharge at a certain angle 50 downward and outward on the draft-opposing side, or a longitudinal separation may be put in the chamber P, between the side perforations and the bottom perforations, to prevent the combustible products from passing through

the wall E, which would be contrary to the 55 spirit of this invention. It is also well to incline the bottom perforations of wall E slightly to the rear, as they discharge freer and keep open better.

Having thus fully described my invention, 60 what I claim, and desire to secure by Letters Patent, is—

1. In combination with a furnace, a hollow deflecting-wall provided with perforations extending from the interior outward through the 65 under face, said wall being situated on a line parallel with the rear face of the bridge-wall and to the rear of an open space behind the bridge-wall and adapted to arrest and deflect the products of combustion downward and underneath the lower face of said hollow wall 70 after they have passed over and beyond the bridge-wall, substantially as and for the purpose set forth.

2. In combination with a furnace, a hollow 75 deflecting-wall provided with perforations extending from the interior outward through the under face and with perforations extending from the interior of said wall outward through the side opposing the draft, said wall being 80 situated on a line parallel with the rear face of the bridge-wall and to the rear of an open space behind the bridge-wall and adapted to arrest and deflect the products of combustion downward and underneath the lower face of 85 said hollow wall after they have passed over and beyond the bridge-wall, substantially as and for the purpose set forth.

3. In combination with a furnace, a hollow 90 deflecting wall or walls provided with perforations extending from the interior outward through the under face and with perforations extending from the interior of said wall or walls outward through the side opposing the draft, 95 said wall or walls being situated on a line parallel with the rear face of the bridge-wall and to the rear of an open space behind the bridge-wall, and adapted to arrest and deflect the products of combustion downward and underneath the lower face of said hollow wall or 100 walls after they have passed over and beyond the bridge-wall, substantially as and for the purpose set forth.

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Witnesses:

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JOHN F. WAKEFIELD.