(No Model.) 2 Sheets—Sheet 1.

P. ABRAHAMSON.

FIRE CHAMBER VENTILATOR.

No. 458,330. Patented Aug. 25, 1891.

Fig. 1.

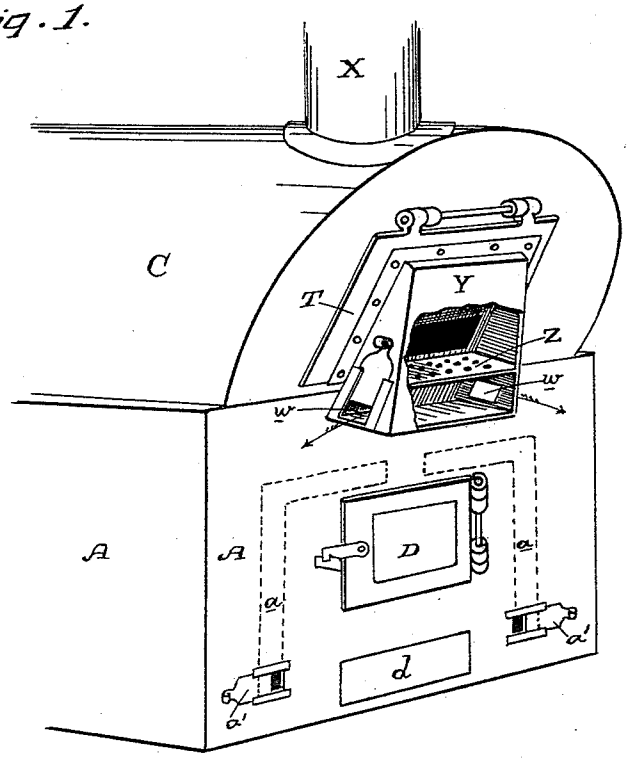
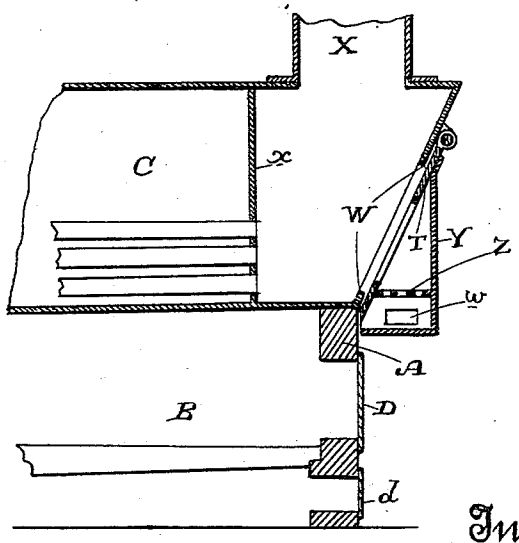


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

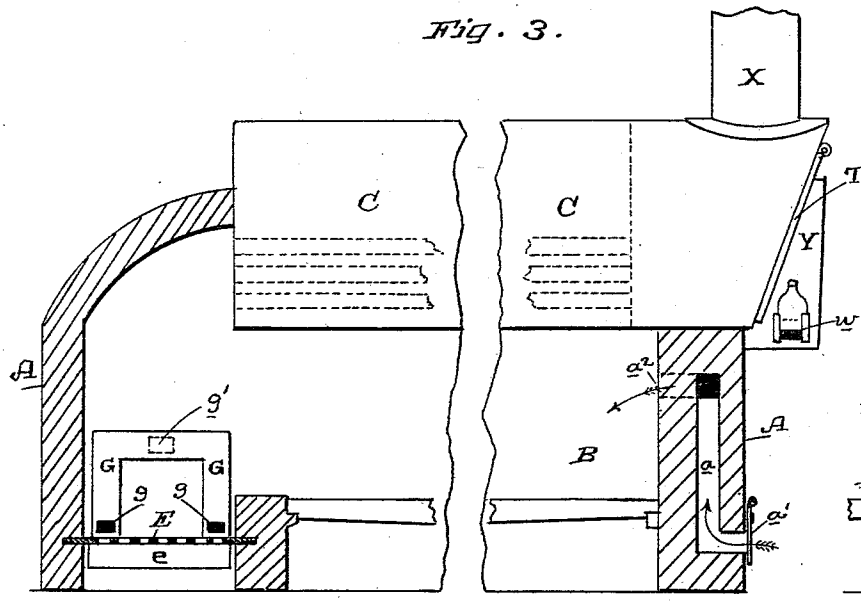


Fig. 4.

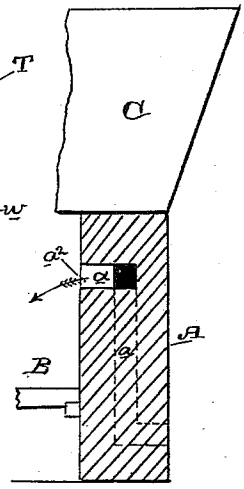


Fig. 5.

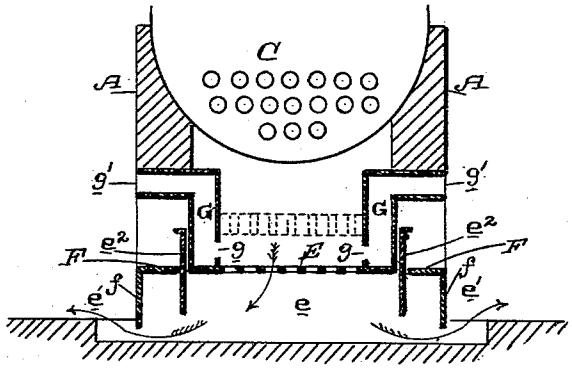
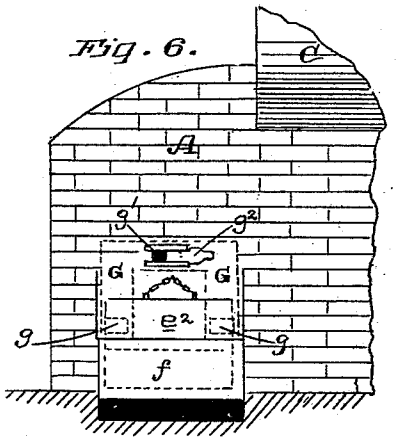


Fig. 6.



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UNITED STATES PATENT OFFICE.

PETER ABRAHAMSON, OF SAN FRANCISCO, CALIFORNIA.

FIRE-CHAMBER VENTILATOR.

SPECIFICATION forming part of Letters Patent No. 458,330, dated August 25, 1891.

Application filed April 4, 1890. Renewed July 14, 1891. Serial No. 399,458. (No model.)

To all whom it may concern:

Be it known that I, PETER ABRAHAMSON, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Fire-Chamber Ventilators; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the general class of fire-chambers, and especially to the means for ventilating them.

It consists in the novel arrangement of passages hereinafter fully described, and specifically pointed out in the claims.

The objects of my invention are to provide means for supplying the fire-chamber with fresh air and to draw off from it the foul gases which accumulate within it.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a perspective view of the front of a furnace, showing the front ventilators. Fig. 2 is a section to show the ventilator-casing Y. Fig. 3 is a longitudinal section of the furnace, showing the passages at front and the passage G in the combustion-chamber. Fig. 4 is a detail section to show the entrance of passage *a* into the furnace-chamber. Fig. 5 is a cross-section of the rear of the furnace, showing the ventilators of the combustion-chamber. Fig. 6 is an outer elevation of same.

Though my invention is applicable to any furnace or fire-chamber, I have herein illustrated it in connection with the furnace or fire-chamber of an ordinary boiler.

A is the shell or brick-work of the furnace, inclosing the fire-chamber B.

C is the boiler portion.

D is the fire-box door, and *d* is the ash-pit door.

X is the stack, and *x* is the front tube-sheet.

To the front wall of the furnace, opposite to the tube-sheet, I secure a hollow casing or hood Y. In the lower portion of this I place a perforated plate Z, which divides the casing into an upper and a lower space.

Through the furnace-wall I make an opening W, which communicates with the upper space of the casing, and in the sides of the casing, at the lower portion, I make damper-controlled openings *w*, which communicate with the space in the casing below the perforated plate. Now in cases where there is a door—such as T—placed in the wall opposite the tube-sheet to permit the cleaning of the tubes I may secure the hollow casing to this door, as I have here shown, and make the opening W through said door. The object of this construction is to provide for a proper ventilation of that portion of the furnace.

The object of the hood or casing Y is to supply air to the smoke-box, in order to assist in the perfect combustion of the unconsumed portion of the products of imperfect combustion, and thus to relieve the passage of such heavy and foul gases as would tend to settle down and clog the draft; and the construction of this hood is such that even should these heavy and foul gases settle in part they will not be in the draftway, but will settle down through the perforated diaphragm Z into the space below it, and when the dampers of the openings *w* are first opened they will puff out, and thus free the smoke-box, and the fresh air will then pass in. The dampers need not remain open long, as the influx of air will be sufficiently rapid to effect the purpose for that time and until it may be necessary to operate them again.

In the rear portion of the furnace, in what may be called the "combustion-chamber," is located the horizontal perforated diaphragm or plate E, which forms a chamber *e* below it, the bottom of which may be dropped down below the level of the outside foundation. This chamber communicates with the exterior air by a passage *e'*—one on each side—which passes under the sides of the furnace. This passage is controlled by a sliding damper or gate e^2, which is fitted in a suitable casting or frame F and is adapted to be raised and lowered by any suitable means. The casting or frame F is formed with a downwardly-extending portion *f*, which forms a portion of the furnace-wall and defines the width of the passage *e'*. In this portion the damper or gate e^2 is seated and works up and down to open or cut off said passage. The casting or frame F is also formed with an upwardly-extending

portion forming a part of the furnace-wall, and on its inner side are formed the passages G, which open out at their inner and lower ends at g into the combustion-chamber just above the perforated diaphragm or plate E. There is one of these passages near each end of the casting. They extend upwardly and then horizontally toward each other and joining open out at g' to the outer air, said opening being controlled by a damper g^2. There is one of these castings or frames let into the furnace-walls on each side near their rear ends. I do not confine myself to forming these passages in castings, as they may be made in the furnace-walls themselves. Their use is as follows:

In the furnace, and especially at its rear portion, there accumulate foul gases and the less volatile products of combustion, which do not pass off through the regular channels. Now by having the perforated diaphragm or plate E these foul gases sink down through it and occupy the chamber e below it, leaving the combustion-chamber above comparatively free; but to insure this and to let them escape when necessary I open the dampers or gates e^2 on each side, whereby they pass out through the passages e'. Then to purify and thoroughly ventilate the combustion-chamber and to positively drive out the foul gases I open the dampers g^2, whereby the fresh air enters through the passages G, thereby creating a circulation, which will carry the foul gases out through the lower passages e'. Nor will this entrance of fresh air be injurious, as in its entrance through passages G it becomes sufficiently heated to not only avoid retarding combustion, but even to assist it, which will effect an economy of fuel, a result gained the more perfectly by the purifying of the combustion-chamber due to the expulsion of the foul gases, as heretofore described.

In the front portion of the furnace, either directly in the front wall or, if desired, in the side walls near the front, are made the passages a, of any suitable construction, simple passages through the brick-work or castings on its inner surface or let into the wall, or tubes, or pipes, as may be found desirable. These, when in the front wall, are located one on each side of the door D. They each open out to the outside at their lower ends, (about at the bottom of the door,) and these openings are controlled by suitable dampers a'. They thence extend upwardly alongside of the door, and thence toward the center longidinal plane of the furnace-wall above the door, and at their upper ends communicate with the interior of the furnace or fire-chamber through openings a^2. The effect and use of these passages are as follows: Fresh air passes through their damper-controlled openings at their lower ends. In its passage through them the air becomes heated and is delivered through their inner openings directly into the fire-chamber and upon the mass of fuel therein. Thus a proper feed of fresh air to the furnace is effected and results in more perfect combustion and consequent economy in the consumption of fuel. It will be seen that by the peculiar location and direction of these several passages their dampers may be opened without allowing cold air to rush in, which differs from the effect of opening doors in either end of the furnace or chamber.

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

1. In a furnace or fire-chamber, the hollow casing in its front wall opposite the front tube-sheet, the perforated plate in said casing, an opening in the furnace-wall above the plate and connecting the hollow casing with the interior of the furnace, and damper-controlled openings in the sides of the casing connecting the space below the plate with the outer air, substantially as herein described.

2. In a furnace or fire-chamber, the combination of the door in its front wall opposite the front tube-sheet, the hollow casing secured to the door, the perforated plate in the casing, the opening in the door above the plate, and the damper-controlled openings in the casing sides below the plate, substantially as herein described.

3. In a furnace or fire-chamber, the side passages G at the rear portion of its sides, said passages each having a single damper-controlled opening communicating with the outer air and each thence branching horizontally forward and back and downward, and each branch opening into the combustion-chamber, substantially as herein described.

4. In a furnace or fire-chamber, the combination of the lower passages e' in the rear portion of the furnace sides, communicating with the combustion-chamber and with the outer air and having dampers controlling the last-named communication, and the upper passages G in the furnace sides leading from the outer air into the combustion-chamber and having dampers controlling the communication with the outer air, substantially as herein described.

5. The ventilating-frame to be let into the furnace-walls, having a lower portion in which is seated the controlling gate or damper and an upper portion having on its inner surface the passage G, with open lower ends, said passages meeting in the top center of the upper portion and opening through it and controlled by a damper, substantially as herein described.

In witness whereof I have hereunto set my hand.

PETER ABRAHAMSON.

Witnesses:
S. H. NOURSE,
H. C. LEE.