

(No Model.)

C. J. BRUSCHKE.

SMOKE BURNING APPLIANCE FOR STEAM BOILERS.

No. 322,894.

Patented July 28, 1885.

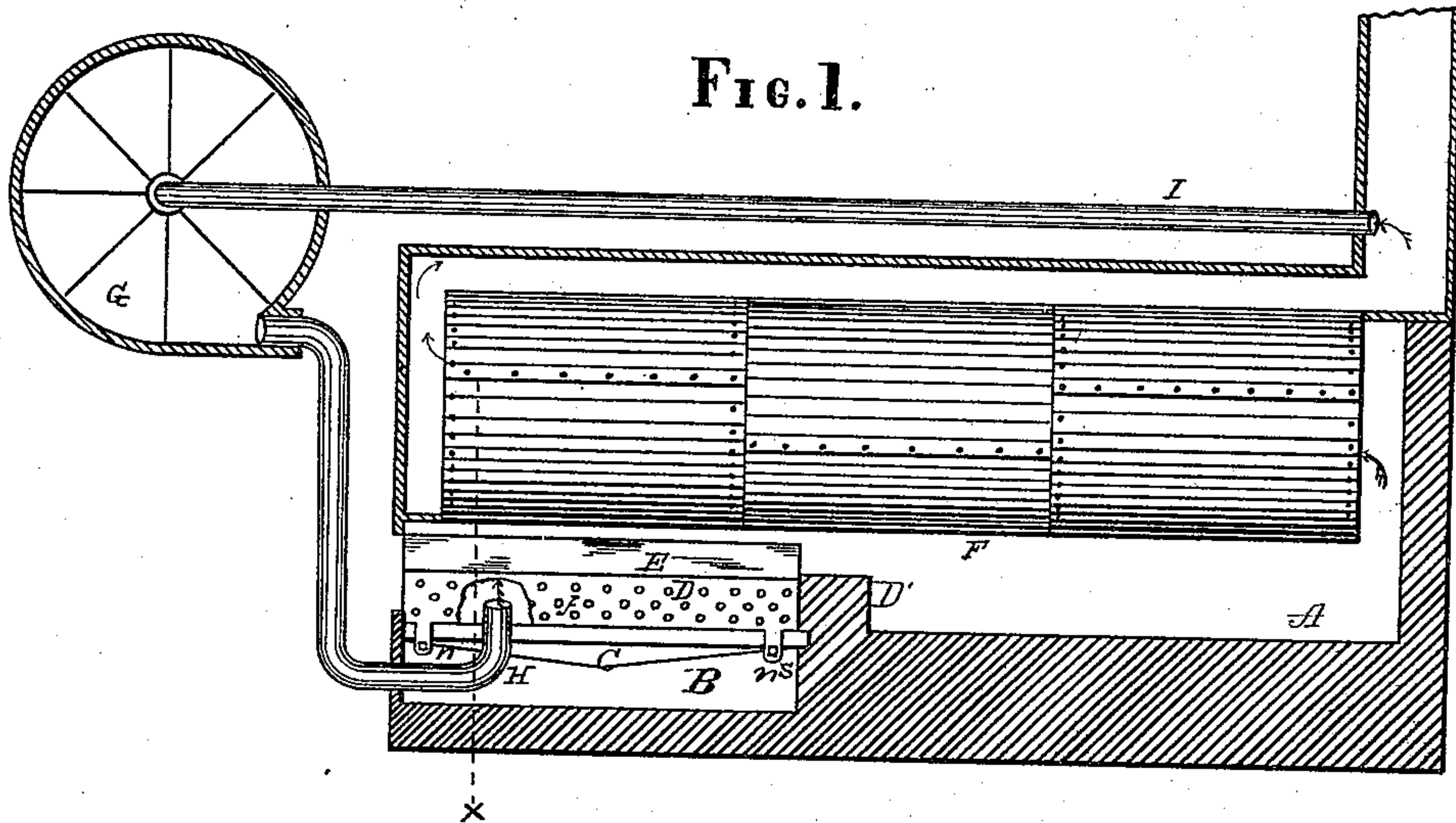


FIG. 2.

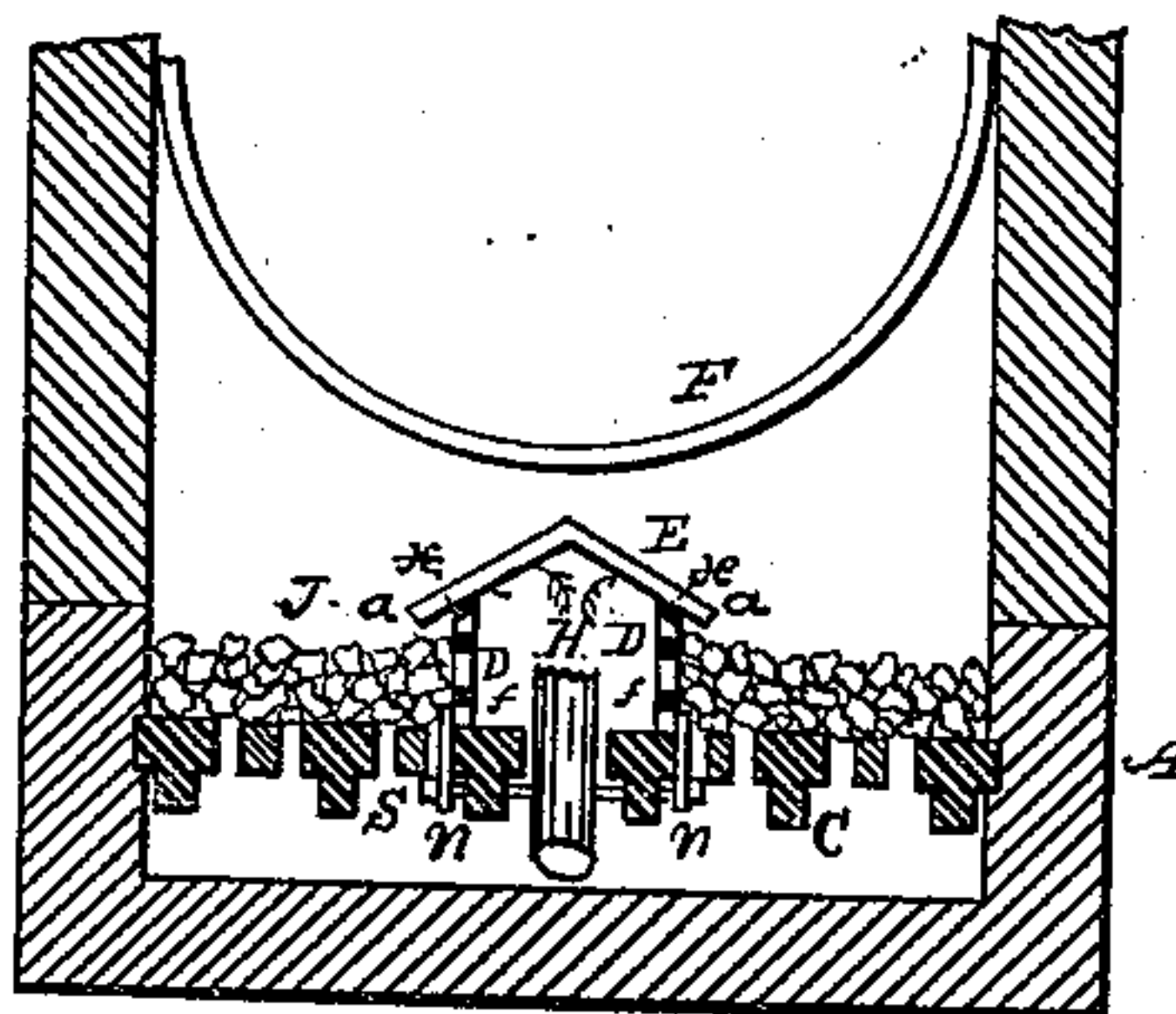


FIG. 4.

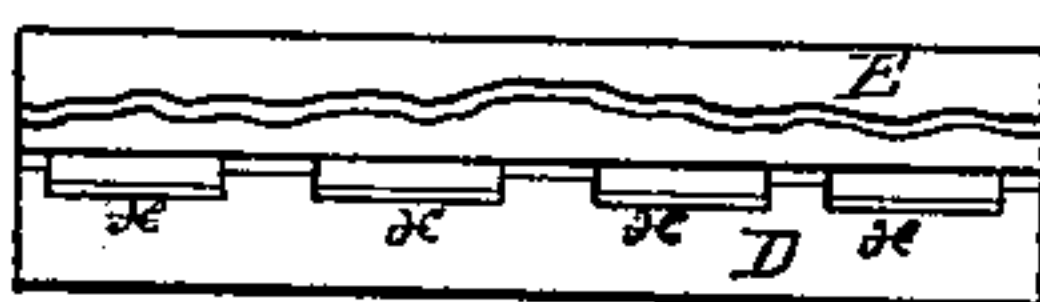
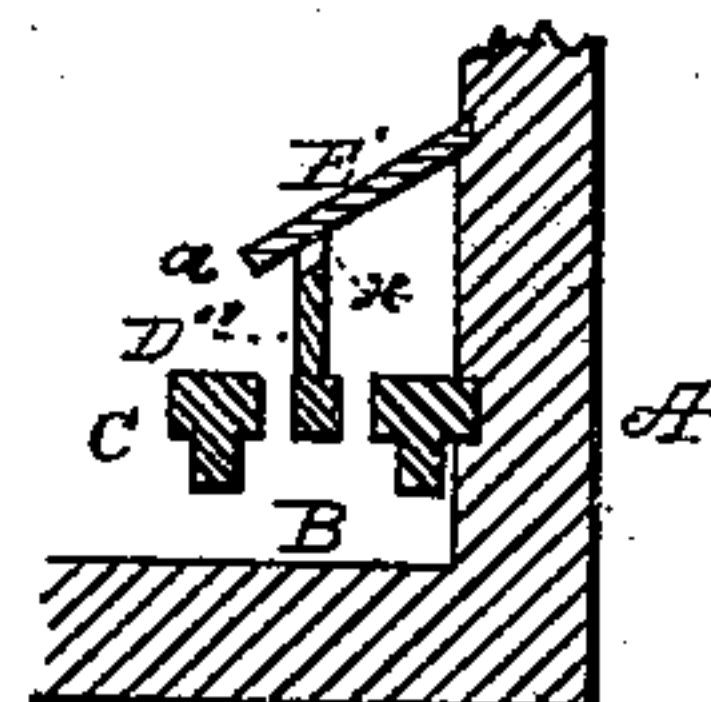


FIG. 3.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

CHARLES JULIUS BRUSCHKE, OF CHICAGO, ILLINOIS.

## SMOKE-BURNING APPLIANCE FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 322,894, dated July 28, 1885.

Application filed May 3, 1883. Renewed May 14, 1885. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES J. BRUSCHKE, of Chicago, county of Cook, and State of Illinois, have invented new and useful Improvements in Smoke - Burning Appliances for Steam-Boilers, of which the following is a specification, reference being had to the accompanying drawings, illustrating the invention and improvement, in which—

Figure 1 is a longitudinal sectional elevation of a steam-boiler furnace and other mechanism embodying my improvement; Fig. 2, a transverse section of the fire-box of the furnace and blast-chamber on line *x*, Fig. 1; Fig. 3, a transverse section of the same fire-box provided with side blast-chambers; Fig. 4, a side elevation of the blast-chamber at Fig. 1, with the roof-deflector broken away better to show the blast-ports at the angles of the chamber.

The object of the present invention is to bring the cold air more directly in contact with the burning coal and to employ such appliances as will give to the suction-blast fan a better position to discharge the products of combustion with reference to the mass of coal, and at the same time to prevent the concentration of heat at the lower part of the boiler in front of the bridge-wall. By practical tests made with suction-blast-fan smoke-burners it is found that where the blast is applied from below the grate-bars the usual accumulation of ashes is such as to prevent a uniform passage of air upward to the live coal; and it is also found that where the air-blast comes into the fire-box above the grate the air passes over the bridge-wall too rapidly properly to bring the air to the burning coal. This is especially the case where fresh coal is fed to the fire-box. I remedy this difficulty by what I term a "blast compartment or chamber," which is preferably placed in the middle of the fire-box longitudinally with the grate-bars, and attach it to them or secure its ends to the bridge-wall and front of the fire-box. Where this blast-chamber is placed in the middle of the fire-box it is house-roofed for the purpose of keeping its top part free from coal and ashes, and for deflectors on the inside thereof to turn the blast somewhat down into the burning coal that the full benefit of the oxygen may be attained at a place where the more complete combustion may take place. It has also been

found that where the suction-blast is employed the ordinary fire-box is too wide—that is, if a suitable depth of coal be kept on the ordinary grated fire-box too great a heat will be attained; and such width of fire-box in other respects is not the best for the economical use of coal and the perfect burning of the first products of combustion. By the use of my blast-chamber the oxygen is properly brought to the coal, the fire-box narrowed so that a proper depth of coal can be supplied to attain the greatest heat, and the heat is deflected from the center of the boiler in front of the bridge-wall, and nearly all the smoke is consumed.

One method of carrying out my improvement and invention is as follows: A represents the masonry, F the boiler, B the ash-pit, D' the bridge-wall, and J the fire-box, of an ordinary return steam-boiler furnace, and C is the grate. D represents the sides of my blast-chamber, and E E is a double inclined roof, the eaves *a a* of which project, as shown, over the sides D far enough to prevent the air passing outwardly through the ports *x x* from rising up before it is brought in contact with the coal. The means for fastening the chamber D to the grates C consist of straps *n n*, projecting down from the sides of the chamber to points below the grate, and bolts put through the straps. In practice the blast-chamber should extend back to the bridge-wall, because the space at the back end of the chamber and the said wall could not well be supplied with fuel, neither could the ashes be well removed; but it is not a necessity that it should extend to the front of the fire-box.

The material used for the chamber is cast-iron, and I prefer that it be a solid casting with solid ends and perforated sides, and especially with the air-ports *x* under the eaves, that the incoming air, striking the inclined roof E E, will be deflected down into the coal, as stated. One or more tiers of air-ports, *f*, may be formed in the sides of the chamber to bring oxygen to central part of the body of coal. Generally the chamber D should in width be about one-fifth of the width of the fire-box, and its eaves come to about the top of the bridge-wall D', and the apex of the roof come quite closely to the boiler. The cross-section at Fig. 2 is enlarged, and shows the proportions closely enough for practice.

The pipe H should project into the chamber,



as shown, to bring the oxygen to the coal to produce the best results; but if it be brought higher or lower in the chamber the device will yet perform a better function than any other  
5 means of which I have knowledge; and by dividing the body of coal on the grate the heat is deflected from the center of the boiler, where formerly the heat was much greater than at the sides of the fire-box, causing the destruc-  
10 tion of the boiler at a point centrally in front of the bridge-wall.

Fig. 3 represents what I term a "half blast-chamber," which is to be placed at the sides of very wide fire-boxes, in addition to the cen-  
15 tral chamber, the parts E' D" corresponding to the parts E D in the other figures:

I claim as new—

In suction-blast-fan smoke-burners, the blast-chamber D, constructed with air-ports *a* under the projecting eaves *a a*, inclined roof E 20 to deflect the heat from the boiler, side ports, *f*, and means for fastening it to the grate-bars, substantially as described, in combination with the fan G, pipes I, and pipe H, with or without the half-blast chamber, as and for the pur- 25 pose specified.

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Witnesses:

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