

(No Model.)

C. McGINNIS.  
SMOKE CONSUMER.

No. 401,846.

Patented Apr. 23, 1889.

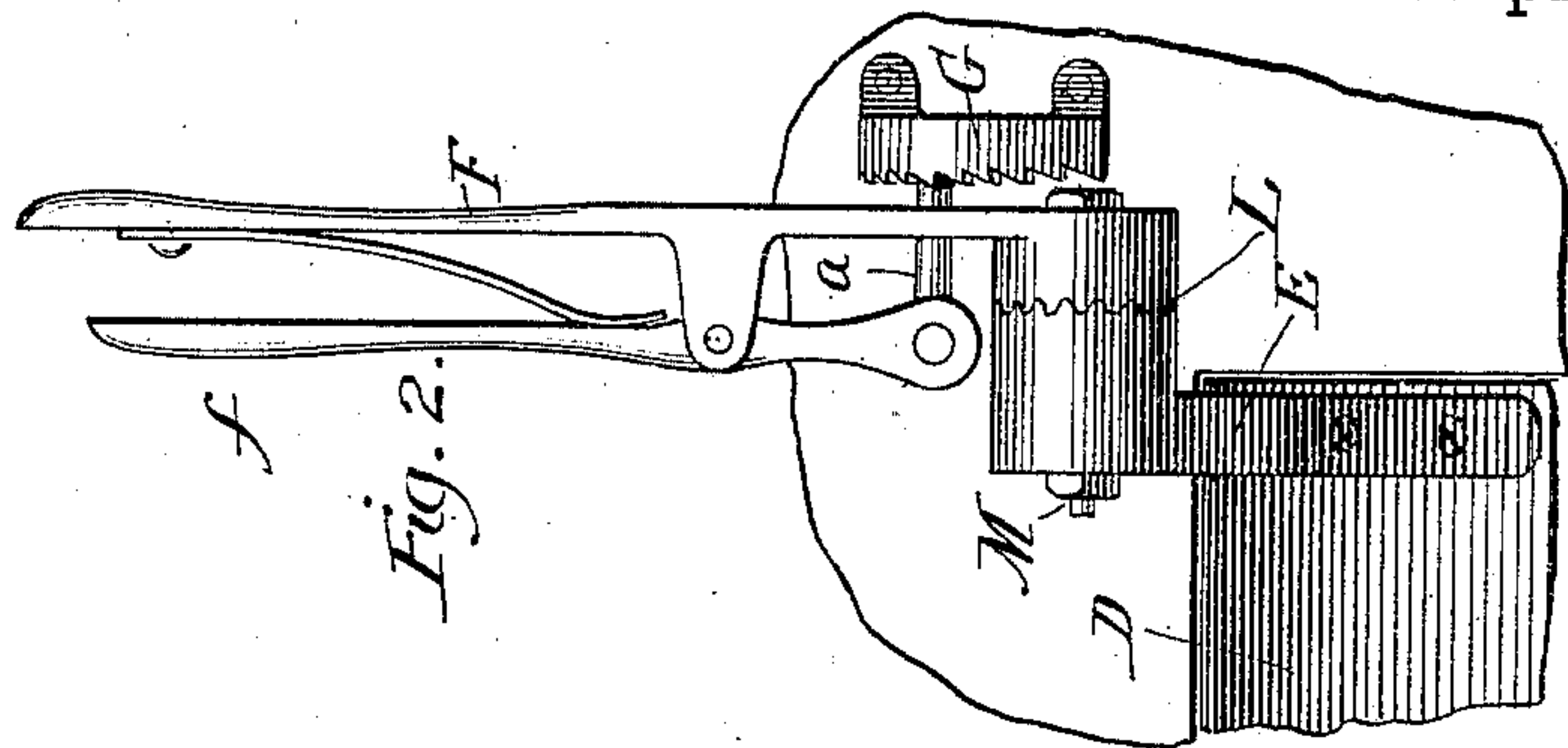
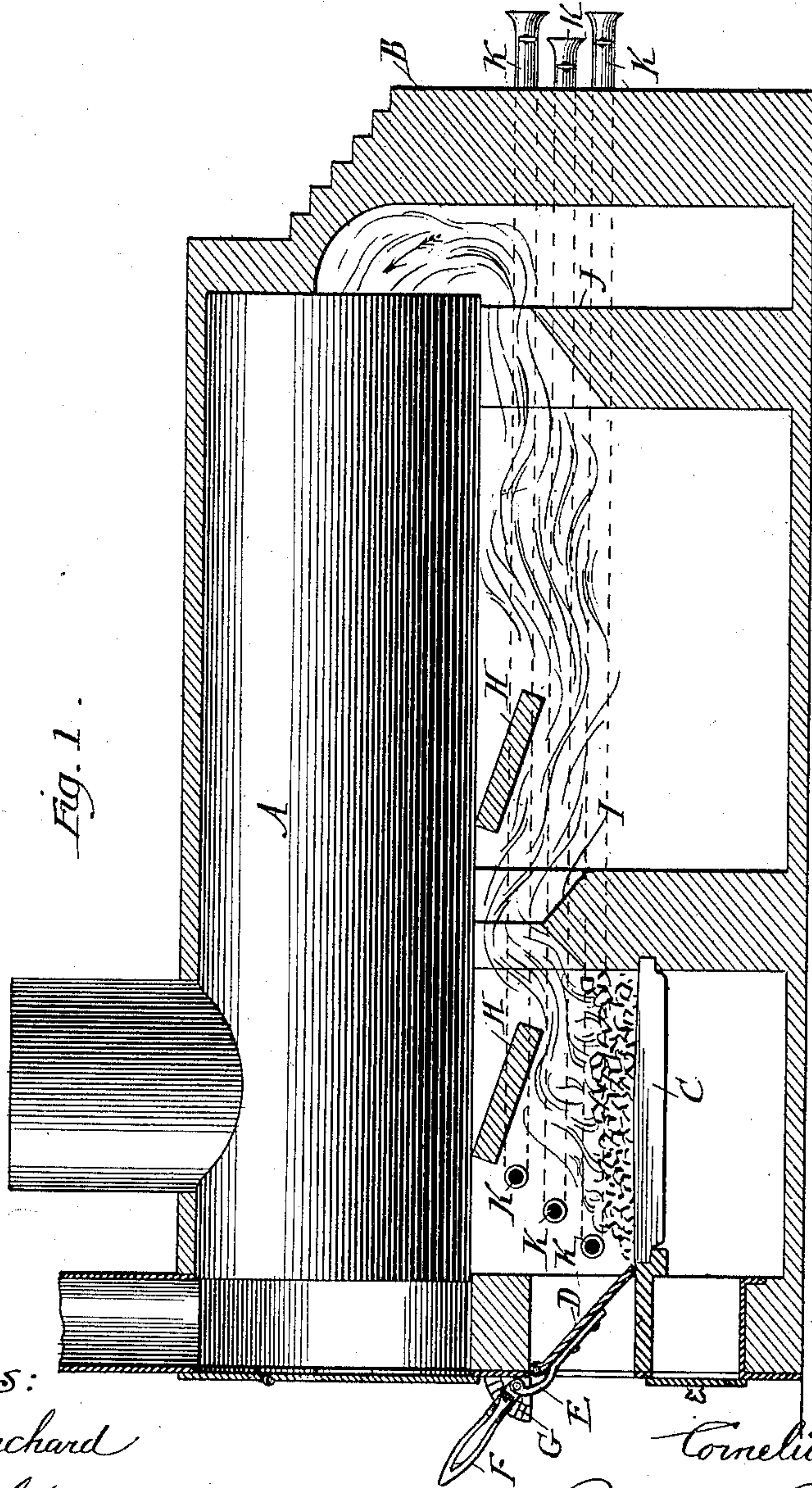


Fig. 1.



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# UNITED STATES PATENT OFFICE.

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## SMOKE-CONSUMER.

SPECIFICATION forming part of Letters Patent No. 401,846, dated April 23, 1889.

Application filed January 19, 1889. Serial No. 296,928. (No model.)

*To all whom it may concern:*

Be it known that I, CORNELIUS MCGINNISS, a citizen of the United States, residing at Chicago, Cook county, Illinois, have invented a new and useful Improvement in Smoke-Consumers, of which the following is a specification.

The object of the invention is to provide means for feeding both heated and cold air to the fire by an arrangement of pipes or flues and a door, which also involves an improvement in the relative arrangement of the flues by which the heated air is fed to the fire; and the invention consists in the features and details of construction hereinafter described and claimed.

In the drawings, Figure 1 is a vertical longitudinal section through a boiler provided with my improvement; and Fig. 2 an elevation, on a somewhat enlarged scale, of the device for operating the fuel-door.

A is the boiler; B, the brick-work in which it is set; C, the grate-bars; D, the fuel-door; F, a hand-lever attached to the fuel-door by means of a goose-neck, E; G, a notched quadrant; H H, deflectors; I J, bridge-walls, and K K air pipes or flues.

My device (which is shown in the drawings as applied to an ordinary stationary boiler set in the usual manner and provided with grate, ash-pit, &c.) is constructed as follows: I make the fuel-door, preferably a metallic plate supported on a bearing-rod at the outer and upper edge of the entrance to the fire-chamber, in such a way as to revolve freely. This door is broad enough to close the opening into the furnace, and when closed rests in an inclined position, as shown in the drawings. To open and close this door, I next construct the hand-lever F and connect it to the door by means of a goose-neck firmly bolted thereto. As shown more particularly in Fig. 2, this lever is provided with a spring-lever, *f*, carrying a pin at its lower end, which is adapted to engage with the notches in the quadrant G. By this means the door may be held in any desired position. As shown at L, Fig. 2, the goose-neck and lever F are held together by means of a bolt, M, and are constructed with a series of projections which mesh into each other, and, as will be readily seen, the bolt M can

be loosened and the lever set in any desired position with reference to the goose-neck. In whatever position the lever be attached to the goose-neck, it can of course be held by engagement with the notched quadrant G, the object of making the lever adjustable upon the goose-neck being to more readily control the operation of the fuel-door. I next make a series of tubes or pipes, K K K, of any suitable material. These open above the fuel at each side of the fire-chamber, and run from thence back along the sides of the furnace, to which they are fastened. They then preferably project at the rear of the furnace, and are preferably made funnel-shaped, as shown, and provided with dampers or valves whereby they are opened or closed. I have in the drawings shown three of these tubes at each side of the fire-chamber, running one above the other, and each opening above the fuel at a point nearer the back of the furnace than the tube below it; but while I consider this the preferable construction I do not desire to be understood as limiting myself thereto, as any number of pipes may be employed, as desired and as the circumstances of each particular case may demand, and the openings may be directly over each other.

In applying my device to furnaces already built I attach flues to the inside of the brick-work in which the furnace is set; but when my invention is incorporated in a new furnace I prefer to form flues in the brick-work, instead of and in the same relative position as the metal flues.

The furnace should be provided with one or more deflectors, H. I prefer to use two of these deflectors, of the form and size and located as shown in Fig. 1; but their form, size, number, and location may be altered to suit the circumstances of the particular case. There should also, preferably, be two bridge-walls, constructed and located, as shown in Fig. 1, one between the deflectors H H and beveled on both sides, the other near the rear end of the boiler and beveled on one side only; but what was above said with reference to alterations in the number, &c., of the deflectors applies equally to the bridge-walls.

The device operates as follows: When the fuel-door is opened, the air which enters the



fire-chamber is directed to the surface of the fuel, forced by the first deflector to pass along close above such fuel, passes over the first bridge-wall, under the second deflector, and  
5 over the second wall, (if such deflector and wall be used,) and through the flues of the boiler and out at the stack. Air is also admitted to the tubes K, and becoming heated as it passes through these tubes is fed to the fire in a  
10 heated condition. This air is deflected to the surface of the fuel, and mingling with the air admitted through the door D passes along over the same course with it. The door and flues operating together furnish both cold and  
15 heated air to the fire, whereby very advantageous results are attained, and these results are yet more advantageous when the flues open, as shown in the drawings, at points respectively nearer the back of the furnace, in-  
20 asmuch as the air is then fed to different points of the fire and mingled more thoroughly with the gases. By thus feeding heated air to the fuel the combustion is rendered perfect, no smoke is formed, and a great saving  
25 of fuel results in consequence. All of the pipes K K may be opened, or only part of them, this depending somewhat upon the circumstances of each case.

I claim—

30 1. A smoke-consuming furnace provided with flues entering the rear of the furnace and opening above the fuel near the front of the fire-chamber for feeding heated air to the fire, an inclined door, as shown, for feeding

additional air, and deflectors placed at an 35 angle to the surface of the grate for directing the air against the surface of the fire, substantially as described.

2. A smoke-consuming furnace provided with flues for feeding heated air to the fire, 40 an inclined door, as shown, for feeding additional air, and deflectors for directing the air against the surface of the fire, substantially as described.

3. In a smoke-consuming furnace, two or 45 more flues for feeding heated air to the fire, placed one above another, entering the rear of the furnace and opening above the fire at the front end of the fire-chamber, each flue opening at a point nearer the rear of the fur- 50 nace than the one below it, whereby heated air is fed to the different parts of the flame in succession, substantially as described.

4. A smoke-consuming furnace provided with an inclined door for feeding air to the 55 fire, two or more flues for feeding heated air, placed one above another, entering the rear of the furnace and opening above the fuel near the front of the fire-chamber, each flue opening above the fire at a point nearer the rear of 60 the furnace than the one below it, and deflectors for directing the air against the surface of the fire, substantially as described.

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