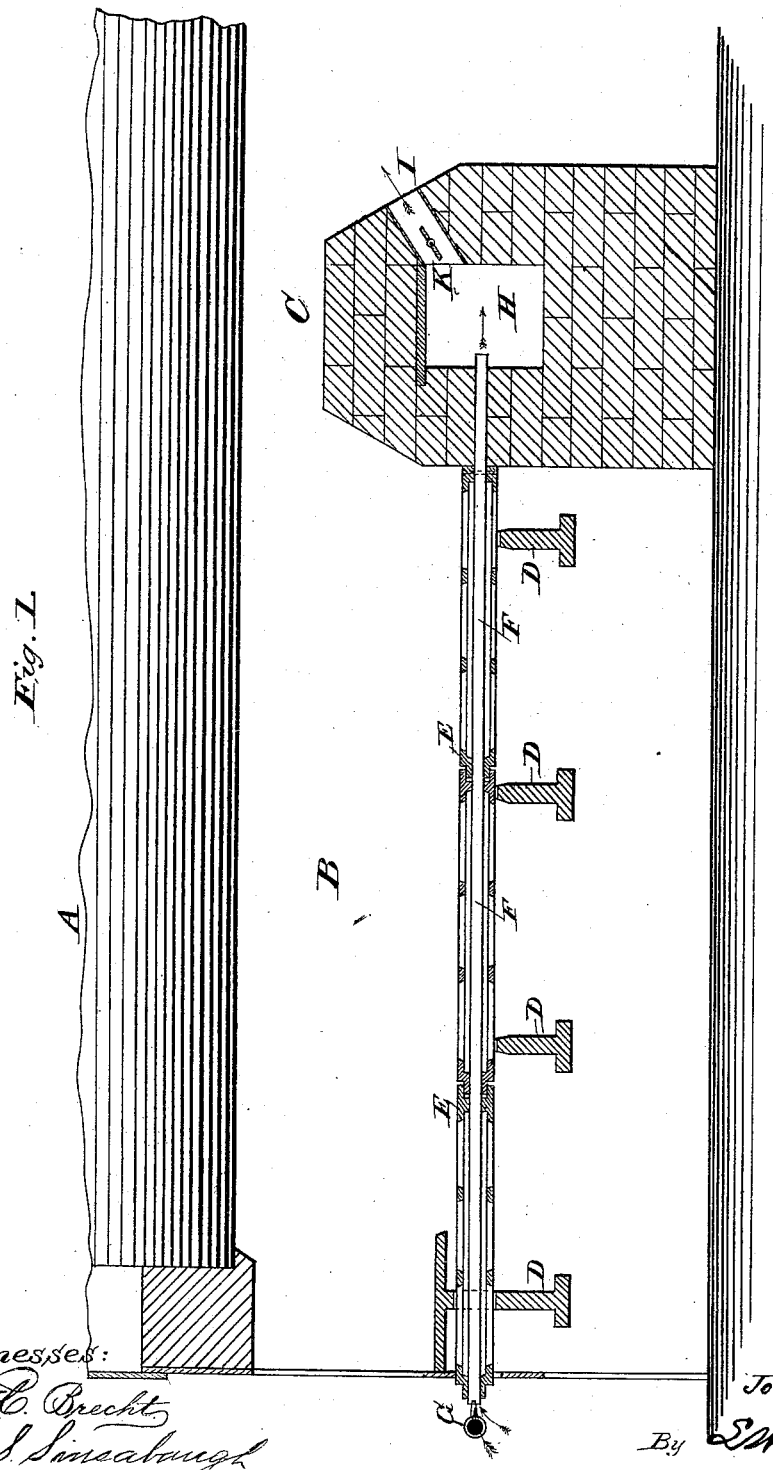
(No Model.)

2 Sheets—Sheet 1.

J. ASHCROFT.

FEEDING AIR TO FURNACES.

No. 347,549. Patented Aug. 17, 1886.



Witnesses:
J. C. Brecht
W. S. Simsabaugh

Inventor:
John Ashcroft,
By W. S. Simsabaugh
Attorney.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3

Fig. 2.

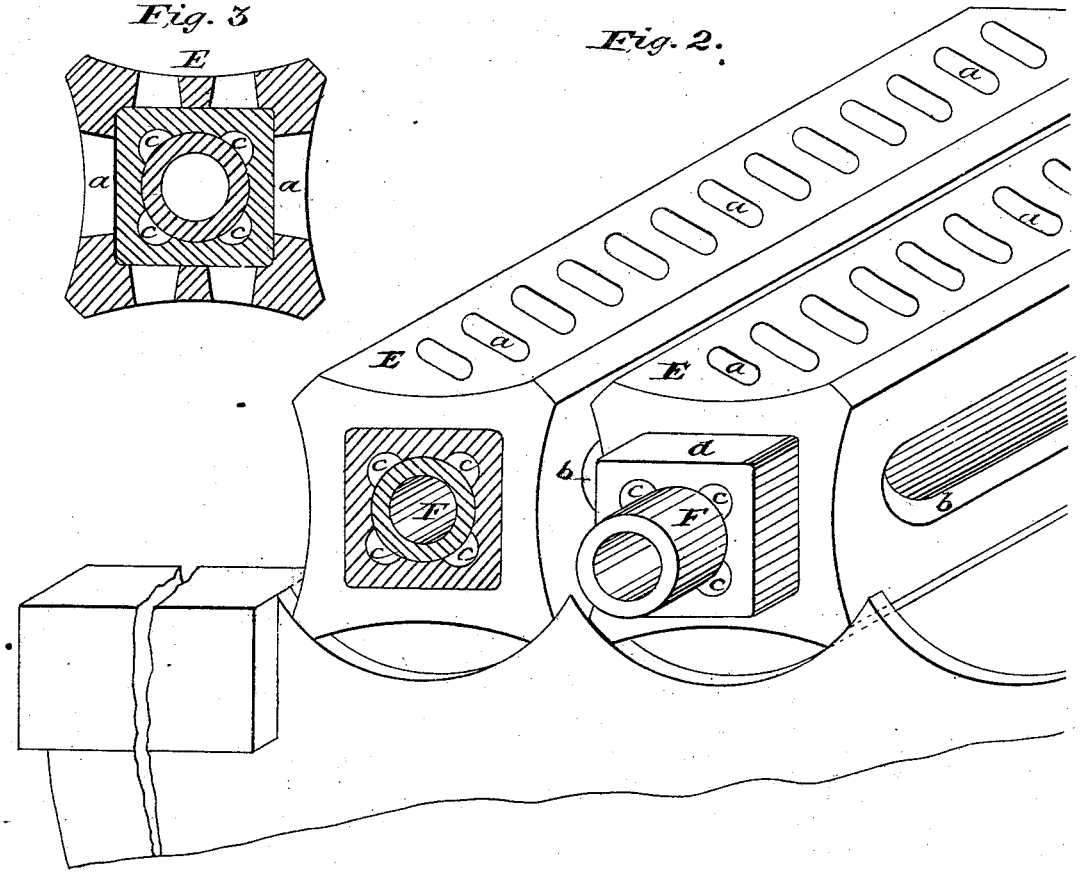
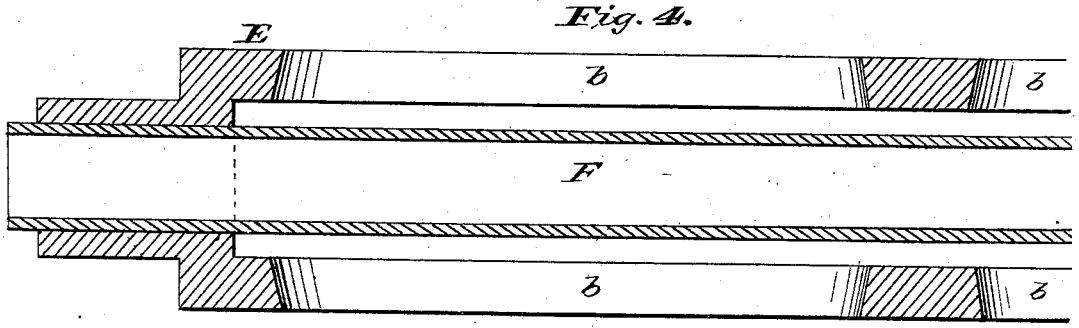


Fig. 4.



Witnesses:
T. C. Brecht
W. L. Swisshaugh

Inventor.
John Ashcroft,
By S. L. Swisshaugh
Attorney.

UNITED STATES PATENT OFFICE.

JOHN ASHCROFT, OF NEW YORK, N. Y.

FEEDING AIR TO FURNACES.

SPECIFICATION forming part of Letters Patent No. 347,549, dated August 17, 1886.

Application filed June 22, 1886. Serial No. 205,921. (No model.)

To all whom it may concern:

Be it known that I, JOHN ASHCROFT, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Devices for Feeding Air to Furnaces, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in devices for feeding air to furnaces; and the object of my invention is to supply the fuel on the grate-bars with air to produce combustion, and then complete the combustion and consume the smoke by mingling or joining with the waste products of combustion a jet or jets of highly-heated air.

My invention therefore consists in combining with hollow perforated grate-bars a pipe or series of pipes for the conveyance of air therethrough to a hot-air chamber in the bridge-wall.

My invention consists, further, in providing one side of the hollow grate-bars with elongated slots to facilitate the discharge of ashes and cinders from the same.

My invention consists, further, in providing the hot air chamber, located to the rear of the grate-bars or in the bridge-wall of the furnace, with a damper or regulating-valve, whereby the quantity of hot air admitted to the waste products of combustion can be regulated and a complete or more perfect combustion of all the gases and smoke effected.

Figure 1 is a vertical longitudinal section of a furnace with my improved air-feeding device therein. Fig. 2 is a view, partly in perspective, of two of my improved grate-bars with the central air or steam pipes therein. Fig. 3 is a sectional end view of one of the grate-bars. Fig. 4 is a longitudinal sectional view of one of my improved grate-bars on a large scale.

Referring to the drawings, A indicates the ordinary steam-boiler for engines or for heating purposes, B the furnace or fire-space, C the bridge-wall, and D the cross-bars or supports for the grate-bars, all of which may be of the construction shown, or of any other suitable or desirable construction.

E are the hollow grate-bars, which may have their faces concaved and slotted or perforated for the admission of air to the fuel to facilitate combustion, and are essentially of the construction shown and described in my Patent No. 221,656, of November 18, 1879. I prefer to make the furnace-bars in sections adapted to interlock at their ends; but they may be made in one piece of the desired length. In the present instance the bars E are provided on their two opposite faces or sides with narrow slits or openings *a*, through which air is supplied to the fuel, while the other opposite faces or sides of the bars are provided with larger openings, *b*, by means of which the ashes and cinders can be readily removed from the fire-bed by simply shaking and turning the bars.

F F are pipes or tubes which pass through the bars E, the front end of which communicates with the external air, or with a pipe, by means of which compressed air or steam may be forced through the pipes into the chamber H, the inner ends of the pipes being passed into the bridge-wall, so as to communicate with said chamber. The front ends of the bars which surround the pipes F are notched, as shown at *c*, so as to permit the free passage of air through the grate-bars to the fuel. The outer ends of the bars are made square or shouldered, as shown at *d*, to receive a wrench, by means of which the bars can be shaken or turned.

H is a chamber located in the bridge-wall of the furnace, and, as before indicated, is supplied with air or steam through the pipes F. The chamber H is provided with an opening, I, which communicates with the combustion-chamber back of or to the rear of the bridge-wall, said opening being provided with a damper, K, by means of which the supply of air or steam can be regulated.

The object of supplying air or steam to the furnace back of or at the bridge-wall is to consume the smoke and gases, which would otherwise escape and pass out the stack unconsumed. It will be noticed that the air in its passage through the pipes F, by coming close to the fire-bed, is highly heated, and on entering the chamber H is further heated, so that when it comes in contact with the smoke and gases which have escaped from the fur-

nace B a further combustion takes place and all the gases and smoke are consumed.

In many instances it may be desirable to supply steam to complete the combustion of the waste gases and smoke. This I accomplish by means of the pipe G, which communicates with any suitable source of supply and is provided with a series of nozzles, which enter the outer ends of the pipes F. These nozzles may be made to fit snugly within the pipes F, or they may be made to fit loosely, so that when the jets of steam are forced through or into the tubes air will be mingled with the steam in proper proportions. It may be proper to remark in this connection that the steam in its passage through the pipe F and chamber H is still further heated, so that it passes out of the opening into the chamber I in a superheated condition.

The pipe G may (when desired) be connected with a reservoir of compressed air, thus increasing the draft of the furnace, and at the same time produce a perfect combustion of the gases and smoke, as hereinbefore explained.

The damper K is provided with any suitable operating mechanism, so that the supply of air can be regulated to meet the requirements of the fuel which is being consumed.

I may employ plain hollow grate bars instead of those having perforated sides; but I prefer to use the bars as shown and described, for the reason that a proper supply of air can be admitted directly to the fire and the fire freed from ashes by simply giving the bars a half-turn to bring the sides of the bars having the large openings so they will form the bottom and top of the bars, and when the ashes are removed through the large openings the bars are turned so as to bring one of the sides having the small openings next to the fire.

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

1. In a device for feeding air to furnaces, a hollow perforated grate-bar adapted to supply air directly to the fire-bed, in combination with a pipe or tube passing through said grate-bars, adapted to conduct air or steam to a chamber located in the bridge-wall, or to the rear of the grate-bars of the furnace, as set forth.

2. In devices for feeding air or steam to furnaces, hollow grate-bars provided with central tubes or pipes which communicate with a chamber located at the rear of the grate-bars, said chamber communicating with the combustion-chamber by means of a channel or duct provided with a suitable damper or valve, whereby the quantity of air or steam to complete combustion is regulated, as set forth.

3. In a device for feeding air to furnaces, the hollow grate-bars having the large and small openings in their sides, as described, in combination with a pipe or tube passing from the front end through the bars longitudinally to the bridge-wall, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN ASHCROFT.

Witnesses:
R. H. WHITTLESEY,
L. W. SINSABAUGH.