(No Model.) 2 Sheets—Sheet 1.

J. ASHCROFT.

DEVICE FOR BURNING GAS IN FURNACES.

No. 332,223. Patented Dec. 15, 1885.

Fig. 1.

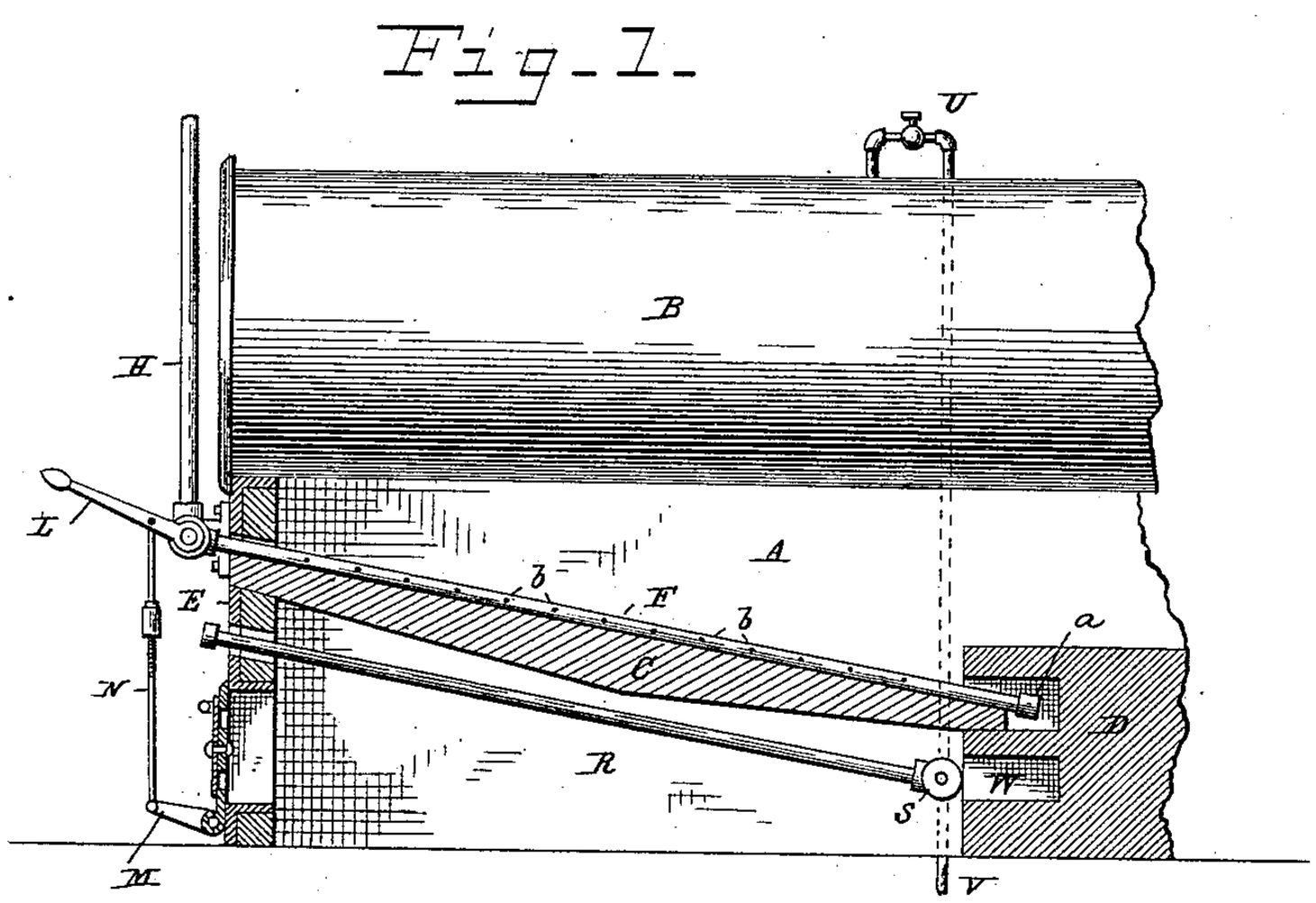
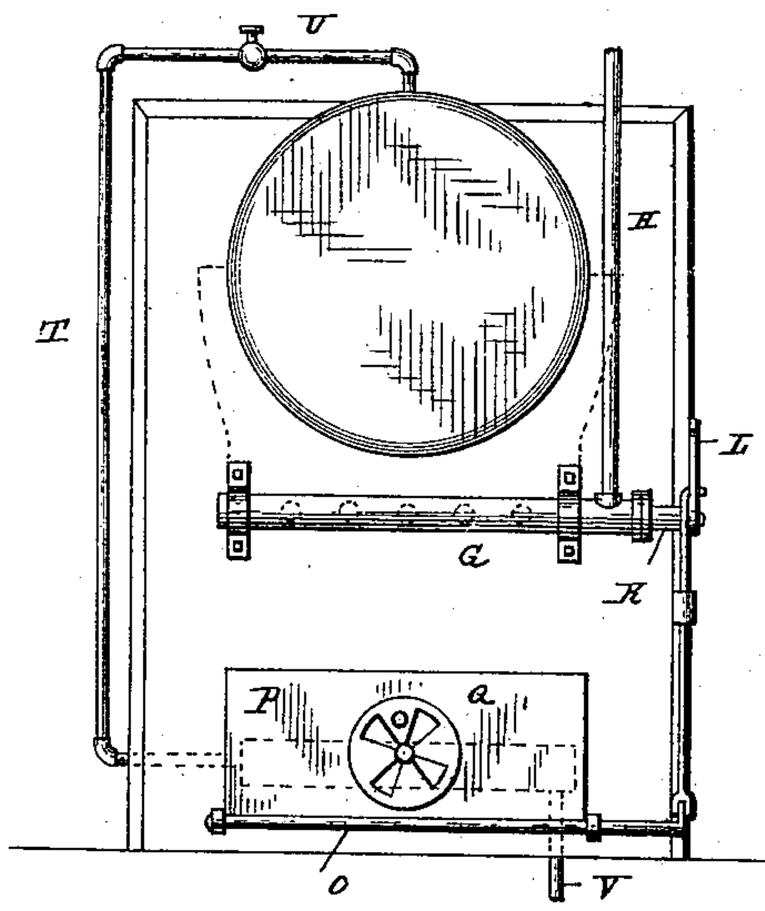


Fig. 2.



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

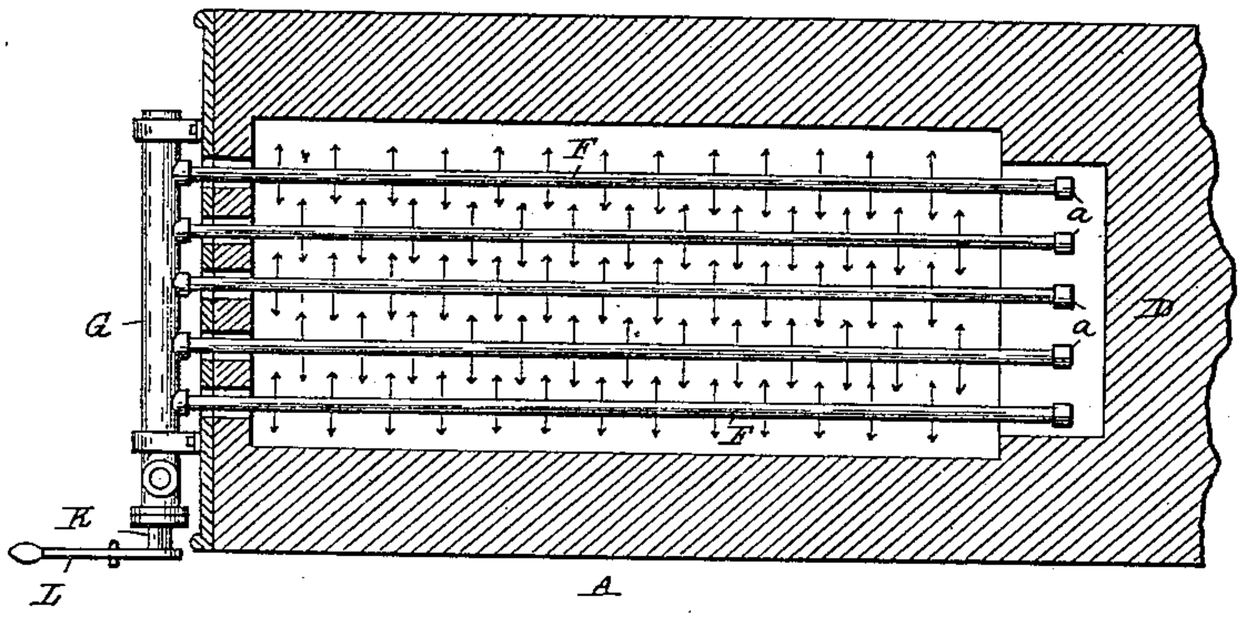


Fig. 4.

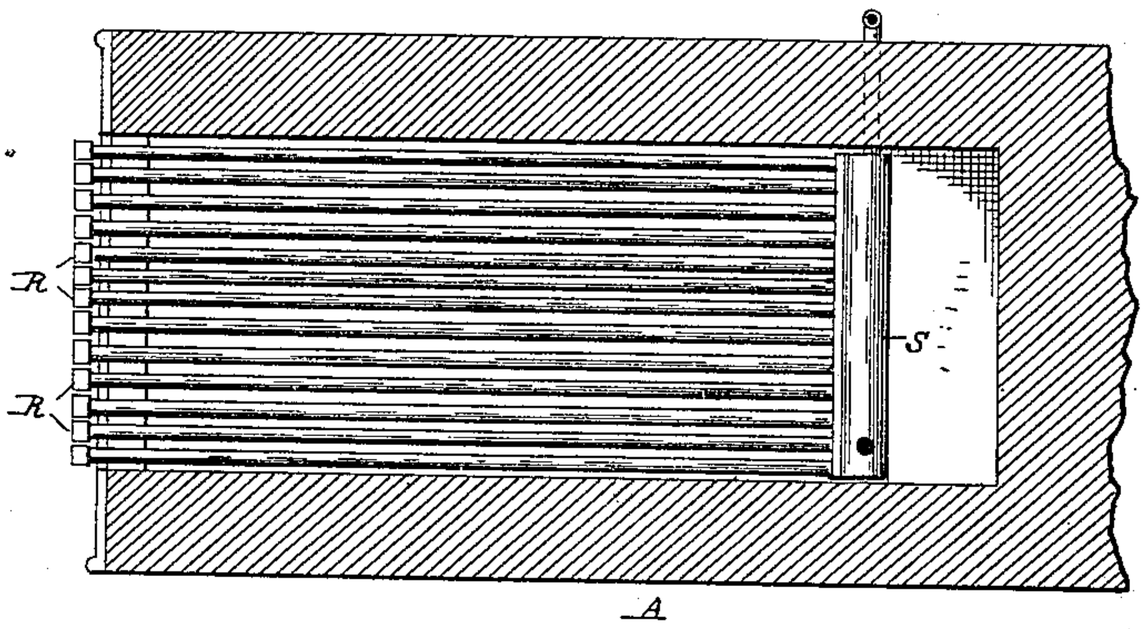
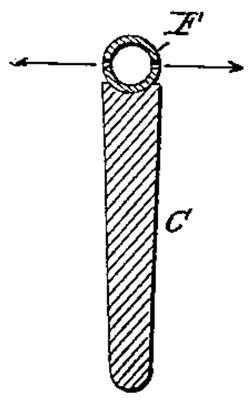


Fig. 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN ASHCROFT, OF NEW YORK, N. Y.

DEVICE FOR BURNING GAS IN FURNACES.

SPECIFICATION forming part of Letters Patent No. 332,223, dated December 15, 1885.

Application filed March 23, 1885. Serial No. 159,813. (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, in the county of New York and State of New York, have invented certain new and useful Improvements in Devices for Burning Gas in Furnaces, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to devices for burning natural gas in steam-boiler and other furnaces.

The object of my invention is to provide a safe and reliable means for burning natural or other gas in furnaces.

My invention consists in providing a boiler-furnace with a series of perforated pipes for the equal distribution of the gas over the entire heating-surface of said furnace, and in arranging a series of steam-heated pipes underneath the gas-pipes, in order to heat the air in its passage between said pipes to the proper temperature to insure complete combustion of the gases.

My invention consists, further, in certain details of construction, which will be fully described hereinafter, and pointed out in the claims.

Referring to the drawings, Figure 1 is a side elevation with the wall of the furnace removed to show the arrangement of pipes, &c. Fig. 2 is a front view. Fig. 3 is a top or plan view on a line above the gas-pipes. Fig. 4 is a top or plan view on a line above the steam-pipes and below the gas-pipes. Fig. 5 is a sectional end view of one of the gas-pipes with the recessed supporting-bar.

A indicates the furnace, which may be of any suitable size or form, and B is the boiler, mounted on suitable supporting-walls in the usual manner. C are a series of strong cast-iron bars, the rear end of which is supported in suitable bearings in the bridge-wall D, while the front end of said bars are supported by the furnace-front E. The upper surface of the bars C is grooved or guttered, to form a suitable and reliable support for the gas-supply pipes F. The inner ends of the gas-pipes are closed by a cap, *a*, while the front ends are screwed into or otherwise connected with the transverse pipe or main, said main being supplied with gas from the pipe H. The gas-pipes are provided with a series of small apertures or perforations, *b*, at suitable intervals, for the discharge of a proper quantity of gas.

In Fig. 3 the arrows indicate the lateral or horizontal direction in which the gas issues from the gas-pipes. The jets of gas from one pipe issue between or intermediate to the jets of the adjacent pipe, by which means a perfect distribution of the gas is effected, and the air which comes up between the pipes is thoroughly mingled with the gas.

As before indicated, the gas is supplied to the main G and distributing-pipes F through the pipe H. The main G and pipe H, being located outside of the furnace-wall, are protected from the heat of the furnace, the supply of gas being regulated or controlled by a valve, K, fitting in the end of the main G, and closing over the end of the pipe H in any well-known manner.

The stem of the valve K is provided with an operating-lever, L, which is connected to a lever-arm, M, by means of the rod N. The lever-arm M is secured to a rod or shank, O, which forms the hinge of the air-door P, so that when the lever L is depressed to admit the gas to the main G the air-door will be opened the required distance to admit the proper amount of air to the combustion-chamber. The air-door P is provided with an auxiliary register, Q, for nicely regulating the quantity of air introduced without involving the movement of the valve K.

I will now proceed to describe the devices by which the air is heated before coming in contact with the gas in the combustion-chamber.

R R are steam-pipes connected at their rear ends to the cylinder or main S, the front ends of said pipes being capped steam-tight. The steam chamber or main S is supplied with steam from the steam-boiler by means of the pipe T, and the admission of steam is controlled by the valve U, the water or condensed steam being discharged from the storage chamber or main S by means of the pipe V. The steam-pipes are placed in an inclined position, as shown, to facilitate the delivery of the water of condensation into the main S. The steam-pipes R are employed to heat the

air in passing upward between them before uniting with the gas issuing from the perforated pipes F.

Only one tier of steam-pipes is shown in the drawings; but there may be employed as many tiers as may be necessary to raise the temperature of the air nearly to the steam heat, if desired.

The arrangement of parts as shown and described permits the easy removal of the gas-jet pipes F or the air-heating steam-pipes R for the purpose of cleaning or reparing. By detaching the gas-main G from the boiler-front and from the supply-pipe H it can be drawn out, together with the several gas-pipes which are attached thereto, through the walls of the boiler-front. In like manner the steam-pipes may be removed—*i. e.*, the pipe V is disconnected from the main or cylinder S, and pushed back into the recess W of the bridge-wall until the forward ends of the steam-pipes drop down, then the whole battery of pipes, together with the main S, can be removed through the door P.

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

1. In combination with the inclined grate-bars, grooved longitudinally at their upper edges, the laterally-perforated pipes supported in said grooves, the gas-connection from which said pipes extend into the furnace, and the valve and operating-lever, all arranged substantially in the manner specified.

2. The combination, with the inclined grooved grate-bars, of the laterally-perforated gas-distributing pipes supported thereon, the steam-pipes located in the furnace below the grate-bars, the gas-regulating valve and its lever, and the adjustable draft-regulator connected to the lever by a suitable rod, whereby the flow of gas and the draft of air are regulated in unison, substantially as specified.

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

JOHN ASHCROFT.

Witnesses:
SAMUEL P. BELL,
A. C. FRISBIE.