

(No Model.)

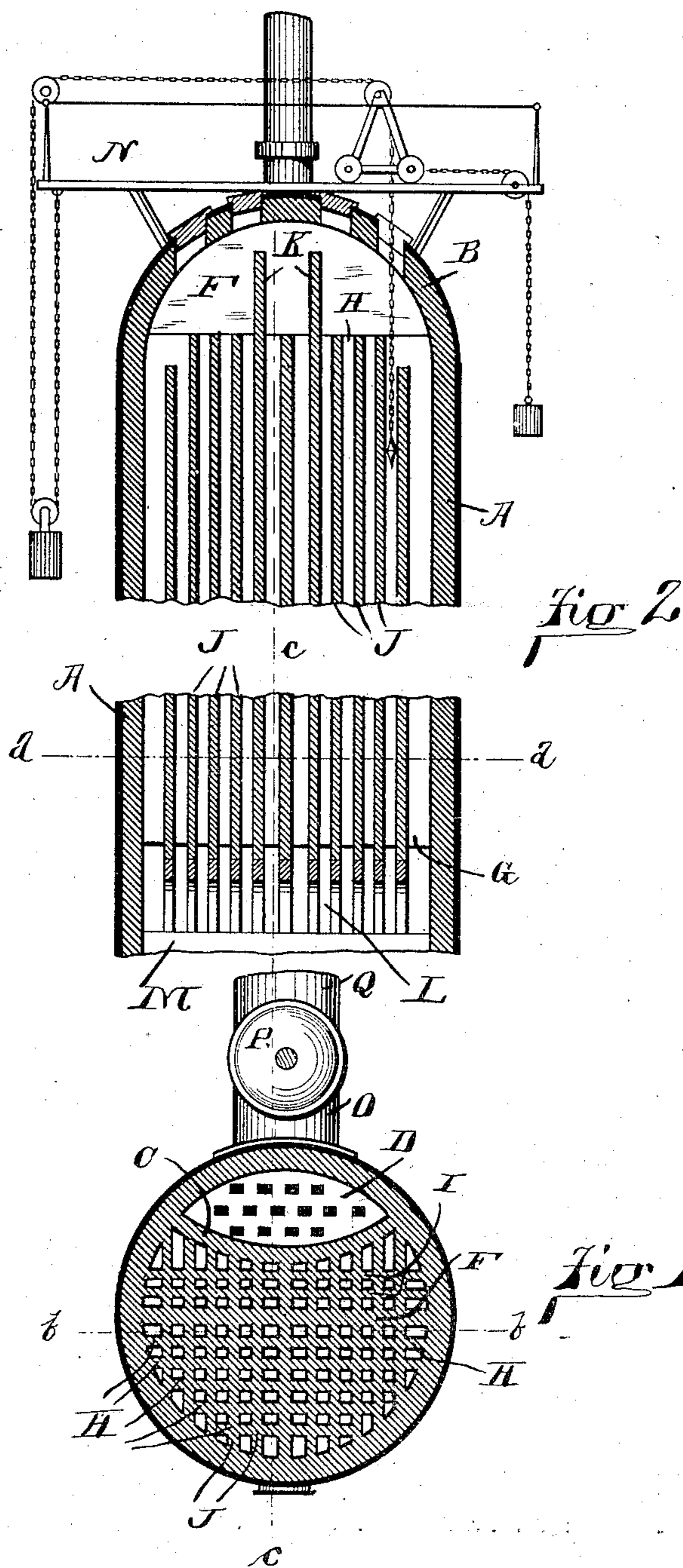
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F. W. GORDON.

HOT BLAST STOVE.

No. 314,573.

Patented Mar. 31, 1885.



Witnesses:

W. A. Seward  
C. D. Mathes

Fred W. Gordon Inventor  
by James W. See  
Attorney

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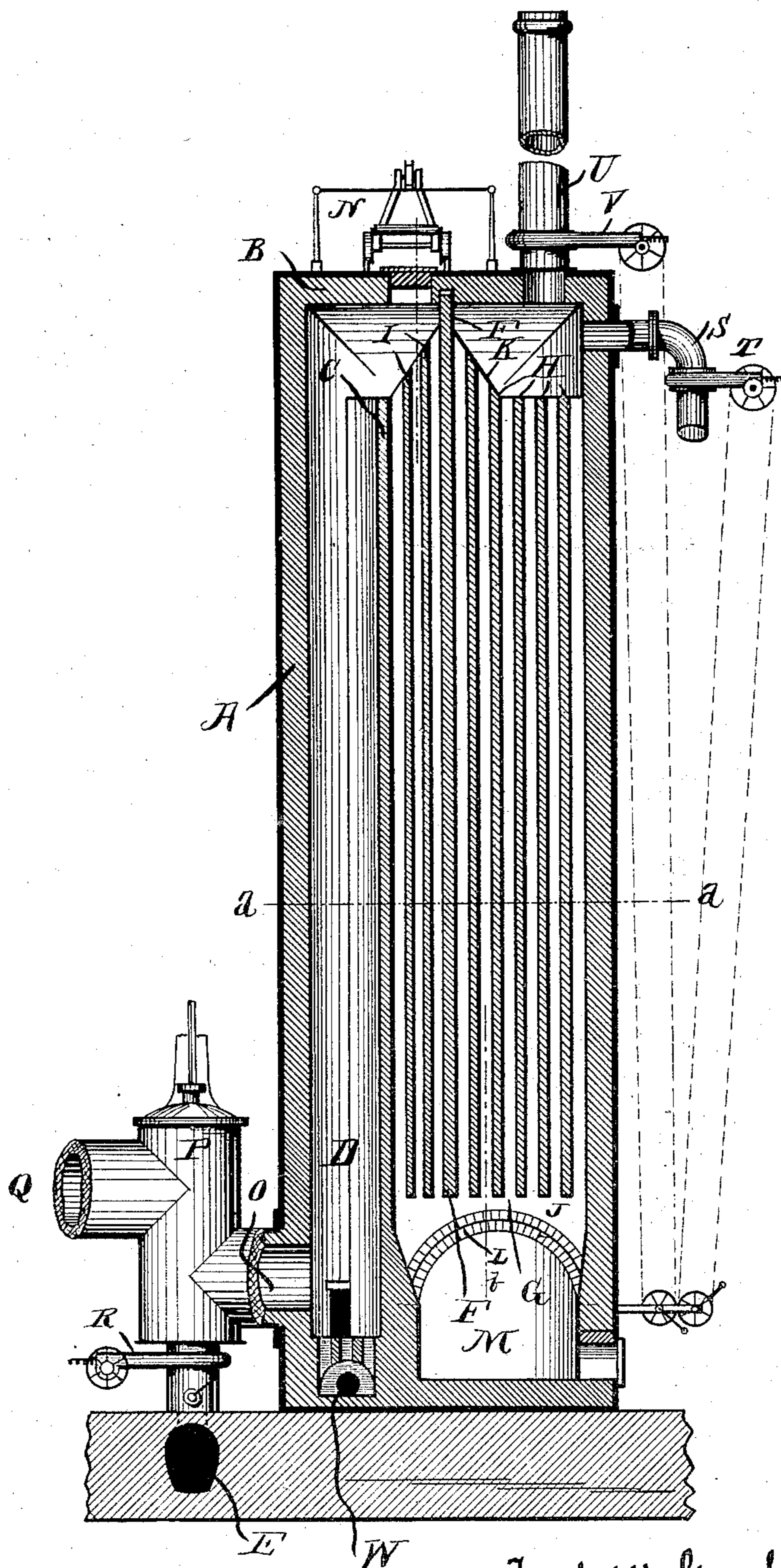
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*Fig 3*

Witnesses:

*W. Seward*  
*C. Mather.*

*Fred W. Gordon*

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# UNITED STATES PATENT OFFICE.

FREDERICK W. GORDON, OF ALLEGHENY, PENNSYLVANIA.

## HOT-BLAST STOVE.

SPECIFICATION forming part of Letters Patent No. 314,573, dated March 31, 1885.

Application filed July 5, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, FRED. W. GORDON, of Allegheny, Allegheny county, Pennsylvania, have invented certain new and useful Improvements in Hot-Blast Stoves, of which the following is a specification.

This invention pertains to stoves for heating the air-blast used in blast-furnaces and the like.

10 The invention relates to stoves of the regenerative type in which a mass of refractory material built in multiflue form is heated by the passage through it of hot gases, the air-blast being subsequently passed through the mass after the heating is completed.

The invention will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

20 Figure 1 is a horizontal cross-section and plan view upon line *a*, Fig. 2, of a hot-blast stove embodying my improvements; Fig. 2, a vertical section of the same upon line *b*, Fig. 1; and Fig. 3, a vertical section of the same upon line *c*.

25 In the drawings, A represents the usual jacket-wall or shell wall of a hot-blast stove in the form of a vertical cylinder incased in a metal shell; B, the roof of the same, being in the form of an arch thrown over the top of the cylinder, the axis of the arch being at right angles to the main division-walls of the stove, or, otherwise, those walls which determine the direction of the gas and air currents within the stove; C, a main division-wall reaching from the base of the stove to near the top of the stove and serving to divide the stove into two general portions, the one to the left of that wall in Fig. 30 3 being the combustion-chamber, and the one to the right of that wall in Fig. 3 being the regenerative chamber, the wall itself being hereinafter denominated the "combustion-chamber" wall; D, the combustion-chamber, reaching from the base to the top of the stove, and walled by the shell wall of the stove and by the combustion-chamber wall C; E, the usual gas-flue; F, a main division-wall reaching from the top of the stove

to near the bottom of the same, and serving to divide the regenerative portion of the stove into a downtake and an uptake, the wall being hereinafter denominated as the "separating" wall; G, the footing-level of the separating-wall and also of certain other walls parallel to that wall; H, a series of walls parallel to the separating-wall, and situated on that side of the separating-wall farthest from the combustion-chamber, the walls reaching from near the top of the stove to the footing-level G, previously referred to; I, walls similar to the walls H, but located between the separating-wall and the combustion-chamber wall; J, a series of walls at right angles to the walls I, just previously referred to and extending the same vertically at the top and substantially the same at the bottom, and reaching from the combustion-chamber wall to the shell wall of the stove, intersecting and being built in with the walls F, H, and I; K, a couple of these walls extended upward higher than their fellows, so as to form buttresses to support that portion of the separating-wall which rises above the general top of the regenerator and reaches to the roof of the stove; L, arches forming the bases of the walls J and serving to support those walls, and, in fact, all of the walls of the regenerator; M, a chamber at the foot of the regenerator below the arches; N, a traversing cleaning apparatus arranged on top of the stove to serve in operating a cleaning-plummet through cleaning-doors in the stove-roof; O, the gas-inlet and hot-air outlet of the stove; P, the usual hot-air valve to serve for cutting the stove off from the hot-blast main; Q, the usual hot-blast main; R, the gas-valve through which the gas-main communicates with the opening O in the usual manner; S, the cold-blast inlet located at the top of the stove at the side farthest from the combustion-chamber; T, the cold-blast inlet-valve; U, the chimney located on top of the stove over that portion of the regenerator farthest from the combustion-chamber; V, the chimney-valve; and W, an arched inlet by which air of combustion is admitted at the foot of the combustion-chamber through per-

forations in the floor of the combustion-chamber.

In the operation of the stove the cold-blast valve is to be closed, the hot-blast valve closed, the chimney-valve opened, the gas-valve opened, and the inlet for the air of combustion opened sufficiently. In this condition the stove is under gas and being heated, the gas igniting at the foot of the combustion-chamber, the hot gas rising in the combustion-chamber, turning over the top of the combustion-chamber wall, passing thence downward through that portion of the regenerator located between the separating-wall and the combustion-chamber wall, thence reaching the chamber at the foot of the regenerator, thence rising through that portion of the regenerator seen to the right of the separating-wall in Fig. 3, thence out through the chimney, the uptake portion of the regenerator serving as a portion of the chimney.

When the stove is sufficiently heated, the gas-valve is closed, the chimney-valve closed, the hot-blast valve opened, the cold-blast valve is opened, and the blast put through the stove in a course directly the reverse of that previously indicated for the heating gases.

The stove is intended to be used in connection with one or more similar stoves, all arranged to be operated upon the usual alternate-regenerator system.

That portion of the regenerator-wall work to the right or to the left of the separating-wall may be omitted, and there may thus be a plain unfilled flue upon either one of the sides of the separating-wall, and, if desired, the number of passes in the stove may be increased by adding any even number of separating-walls, the alternate separating-walls in such case joining the roof, and the intermediate ones the base, of the stove.

It will be noticed that the cross-walls J, with their arches, serve as the supporting medium for the regenerator-wall work. Such construction is not essential; but I much prefer it to construction heretofore patented by me, in which I have supported the regenerative wall-work by piers and lintels, which, by the improvement set forth, I am enabled to dispense with.

While I show the chimney on top of and supported by the stove, I do not wish to confine myself to such an arrangement. It is essential only that the chimney-connection should be at the top of the stove, as it is obvious that a chimney may stand upon a high base alongside the stove, and be connected with a chimney-opening at the top of the stove, or that in a group of stoves a chimney of sufficient area may be erected upon the top of one of the stoves and be connected with the top of all of the stoves, such chimney being used for whichever stove or stoves of the group may be under gas.

I do not confine myself to the specific arrangement of wall-work within the stove, it being essential only that there shall be a successive series of up and down passes extending in a single path from a gas-inlet at the foot of the stove to a chimney-connection at the top of the stove. Neither is it essential that the stove should be circular in plan, a rectangular or elliptical plan being as applicable to the construction embodying my improvement as the cylindrical one.

I claim as my invention—

1. In a hot-blast stove, the combination of a vertical shell, a combustion-chamber wall reaching from the base of the stove to near its top, a hot-blast outlet and gas-inlet at the foot of the combustion-chamber, a separating-wall reaching from the roof of the stove to near the base of the stove, regenerator-walls upon either one of the sides of said separating-wall, a chimney upon the roof of the stove over that portion of the regenerator farthest from the combustion-chamber, and a cold-air inlet at the top of the stove over that portion of the regenerator farthest from the combustion-chamber.

2. In a hot-blast stove, the combination of the vertical shell having an arched roof, a separating-wall reaching from near the base of the stove to the roof of the stove, and arranged with its plane at right angles to the axis of the arch of such roof, a combustion-chamber wall reaching from the base of the stove to near the top of the stove, and regenerator-wall work upon either one of the sides of said separating-wall.

3. In a hot-blast stove, the combination of a vertical shell wall, a combustion-chamber wall reaching upward from the base of the stove, a separating-wall and walls parallel thereto reaching upward from a point above the base of the stove, and a series of walls at right angles to said walls terminating below in arches springing from the shell wall and combustion-chamber wall.

4. In a vertical hot-blast stove, the combination of a combustion-chamber, a final uptake, a vertical pass or series of passes from one to the other, a chimney connecting by a single aperture with the top of said final uptake, and valves to control the flow of gas and air to and from the stove.

5. In a vertical hot-blast stove, the combination, with a combustion-chamber and passes forming a path beyond the same, of a final uptake at one side only of the stove, a chimney in communication with the top of said final uptake, and valves for the control of the flow of air and gas to and from the stove.

6. In a vertical hot-blast stove, the combination, with a combustion-chamber, passes forming a path beyond the same, and valves for the control of the flow of air and gas to and from the stove, of a final uptake, and a

chimney-connection directly over the top of said final uptake and in communication therewith.

7. In a vertical hot-blast stove, wall-work  
5 arranged to form an odd number of passes, a chimney-connection at the top of the stove, a cold-blast inlet at the top of the stove, a gas-inlet and hot-blast outlet at the base of the

stove, and valves for the control of the flow of gas to and from the stove.

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