(No Model.) 3 Sheets—Sheet 1.

F. A. JONES.

FURNACE.

No. 540,987. Patented June 11, 1895.

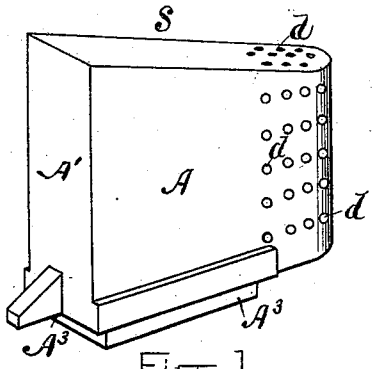

Fig. 1.

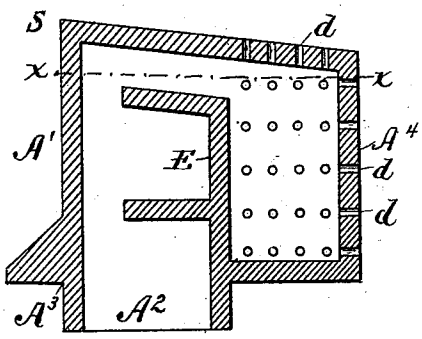

Fig. 2.

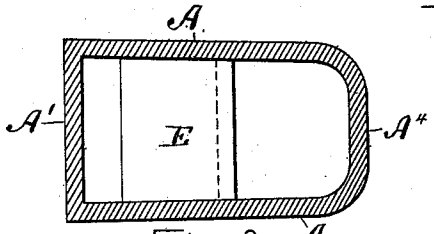

Fig. 3.

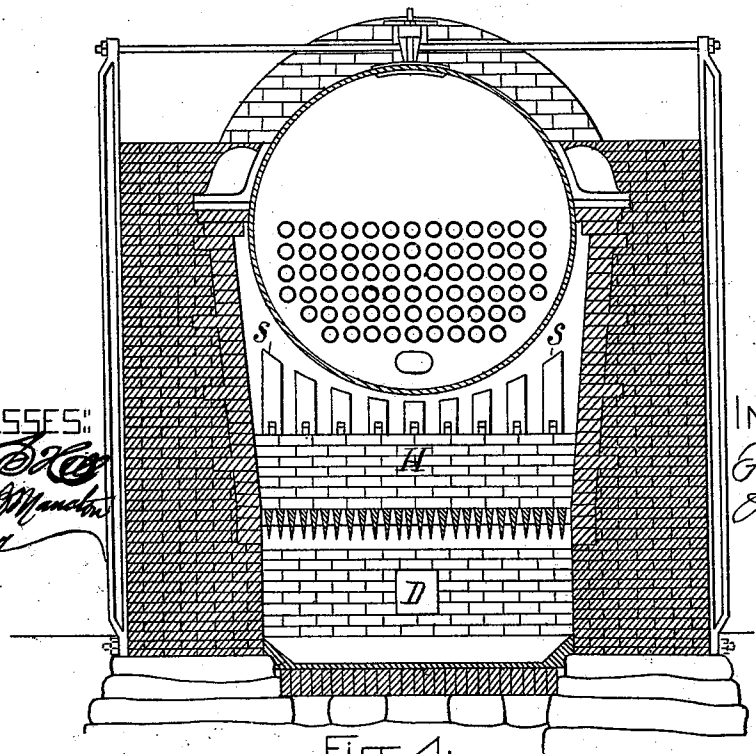

Fig. 4.

WITNESSES:
Edgar Tate
Edward F. Mundt

INVENTOR:
Florentine A. Jones

(No Model.) 3 Sheets—Sheet 2.

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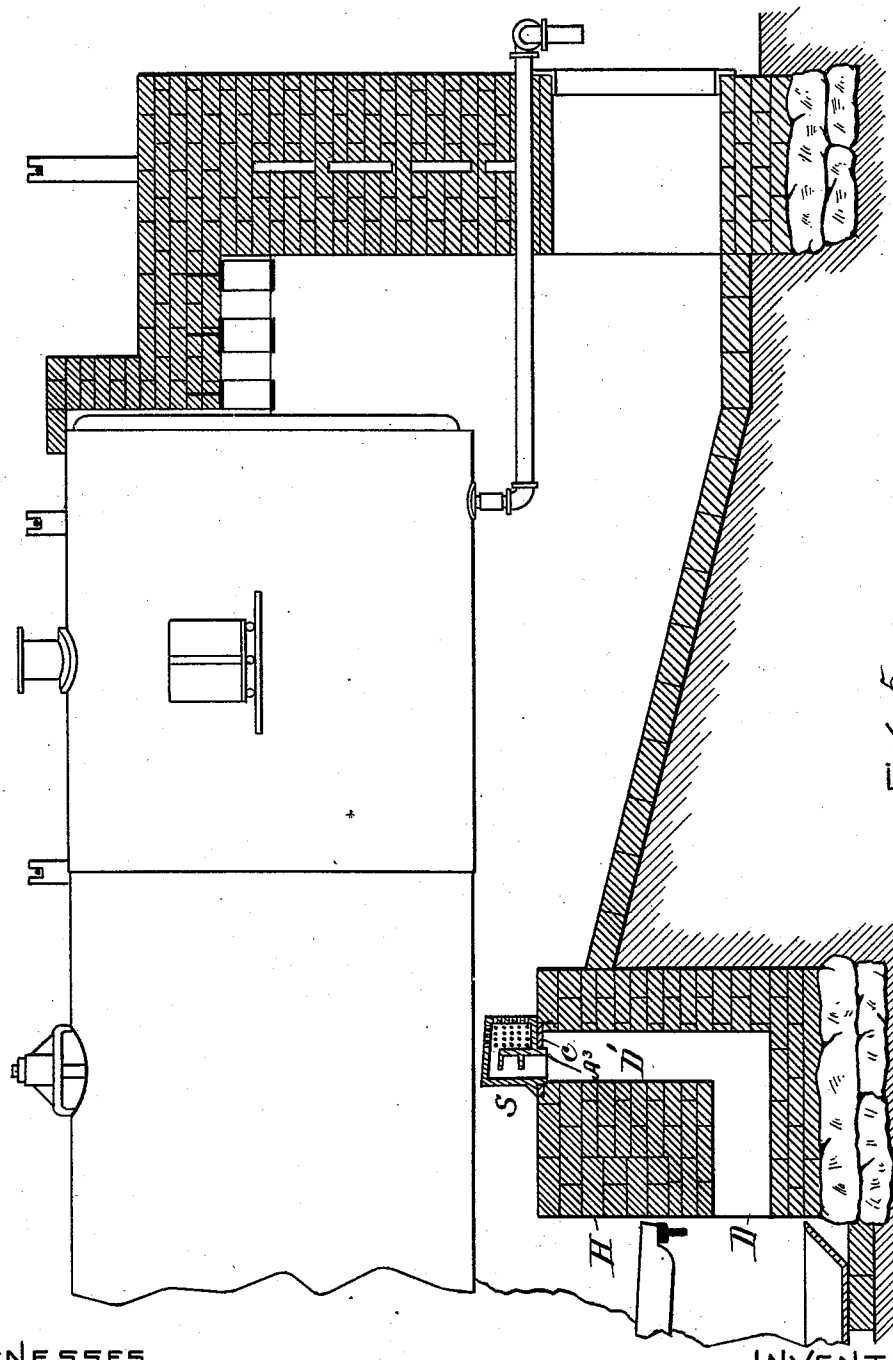

Fig. 5.

WITNESSES.
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INVENTOR.
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(No Model.) 3 Sheets—Sheet 3.

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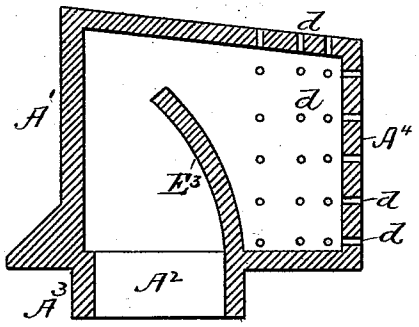

Fig. 6.

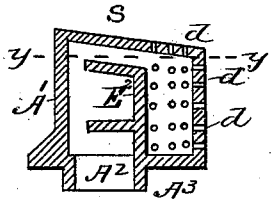

Fig. 10.

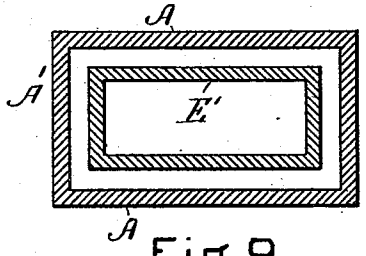

Fig. 9.

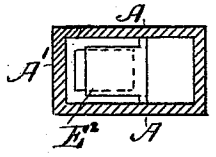

Fig. 11.

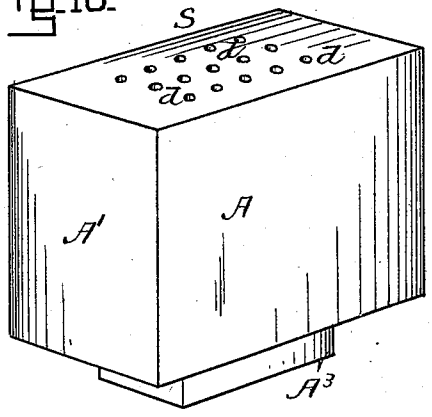

Fig. 7.

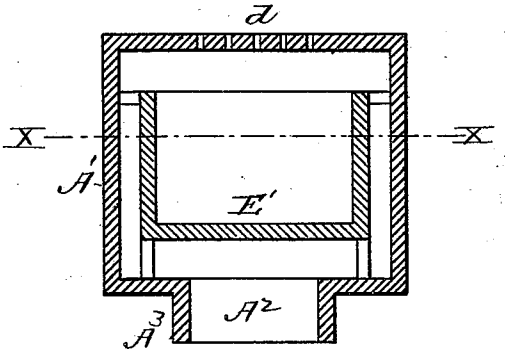

Fig. 8.

WITNESSES

Edgar Tate

Edward S. Manaton

INVENTOR

Florentine A. Jones

UNITED STATES PATENT OFFICE.

FLORENTINE A. JONES, OF MALDEN, MASSACHUSETTS.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 540,987, dated June 11, 1895.

Application filed June 28, 1894. Serial No. 515,973. (No model.)

To all whom it may concern:

Be it known that I, FLORENTINE A. JONES, of Malden, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Devices for Supplying Air to Furnaces, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention is adapted to improve the combustion of the various substances used as fuel, as well as gas or gaseous fuels, oil, or other liquid fuels, and has for its object to provide means whereby air, or other combustion supporting mixtures or compounds, may be applied within and diffused through a volume of combustible products in a highly heated state, and especially in a manner to insure or increase the durability of the air supplying device. This object I attain by means of the improvements shown in the accompanying drawings, in which—

Figure 1 is a perspective view of an air-chamber or tuyere embodying my invention for supplying air or other combustion-supporting mixture. Fig. 2 is a vertical section of the same. Fig. 3 is a horizontal section taken on line *x x* of Fig. 2. Fig. 4 is a transverse vertical section showing a horizontal tubular boiler provided with a series of said chambers or tuyeres in accordance with my invention. Fig. 5 is a longitudinal vertical central section of the construction shown in Fig. 4. Fig. 6 is a vertical section showing a modification of the chamber or tuyere. Fig. 7 is a perspective view representing another modification. Fig. 8 is a vertical section of the chamber or tuyere shown in Fig. 7. Fig. 9 is a horizontal section taken on line *x x* of Fig. 8. Fig. 10 is a longitudinal vertical section of another modification of my device for supplying combustion-supporting mixtures. Fig. 11 is a horizontal section on line *y y* of Fig. 10.

In carrying out my invention I provide an air chamber or tuyere S which is of such form that a series of said chambers or tuyeres may be assembled in a row upon a support, such as a bridge wall H, extending across a furnace or fire-box, and when so assembled their forward ends A′ will constitute a series of heat absorbing faces confronting the fire space over the grate, while their sides A which extend rearwardly from said faces, will form the walls of a series of throats or flues through which the products of partial combustion pass from the fire box across the bridge wall. I therefore term the said sides A, throat walls, their function being to form the sides or walls of a series of throats, and to absorb heat from the products of partial combustion passing through said throats.

Each chamber has a base formed to fit the support on which it rests, and in said base is an air inlet A^2, which is preferably formed in a hollow shank A^3, projecting downwardly from the base, and adapted to enter an orifice in a plate *c*, on the bridge wall, said orifice communicating with an air passage D′, which may communicate at D with the ash pit, or may be otherwise connected with a source of supply of air or other combustion supporting mixture.

Each chamber has a plurality of air outlets *d*, which may be arranged in any suitable way to diffuse the heated air through the products of combustion passing along the external surfaces of the series of chambers.

Between the air inlet A^2 and the air outlets *d* of each chamber, is an internal shield or deflector E, which is arranged to deflect the air entering at the inlet A^2, forward against the inner surface of the face A′, and laterally against the inner surfaces of the throat walls A A. The form and arrangement of the said deflector may be variously modified, but in all cases it is essential that it be formed and arranged to cause a continuous pressure of air against all parts of the said face and throat walls that are exposed to a high degree of heat, such pressure being essential to the durability of the structure, because if there is a lack of pressure or if the construction is such as to deflect the air away from the said face and throat walls, or from any part or parts thereof, and particularly from the face, the result will be the overheating and burning out of the part from which the air is deflected, because it is only by the direct pressure of the air against the heat absorbing parts of the chamber, that the air is caused to absorb and carry away sufficient heat to prevent injury to the said parts. It is particularly important therefore that there

be no flanges or projections on the inner surfaces of the face and throat walls, tending to deflect the air away from said surfaces.

The preferred form and arrangement of the deflector E is shown in Figs. 2, 3, 5 and 10, the deflector extending vertically from the rear of the inlet A^2, and having one or more (preferably two) flanges projecting forward toward the face A', the deflector extending in this instance from one throat wall to the other, and having its upper portion separated by a narrow space or throat from the top of the chamber. The air is therefore thrown forward against all parts of the face A', and laterally against the forward parts of the throat walls A, these being the parts of the throat walls that are subjected to the greatest heat.

The base, throat walls, and top of the chamber are, in the construction shown in Figs. 1, 2, 3, 5 and 10, extended backwardly from the deflector, and the outlet orifices *d* are formed in the backwardly extended portions of the throat walls and top, and in the back wall A^4.

The construction shown in Fig. 6 is similar to that shown in the figures above described, with the exception of the deflector, which is shown as a curved or inclined plate E^3, instead of being provided with flanges.

In the construction shown in Figs. 7, 8 and 9, the deflector is a box-like structure E' separated from the base, throat walls, face, and top of the chamber by narrow connected faces, which permit a free passage of air from the inlet to the outlets, the latter being in this case in the top.

In Figs. 10 and 11 I show a deflector E^2 having flanges like the deflector E, but separated from the throat walls by narrow spaces as shown in Fig. 11.

It will be seen that in each case the deflector is formed and arranged to force the air outwardly and cause it to press against the more highly heated parts of the chamber before reaching the outlets, said parts being in each case free from projections tending to deflect the air away from any portion or portions of their surfaces.

I do not limit myself to the location of my improved chambers or tuyeres on the bridge wall of a furnace, but may locate them on any other suitable support which will present their faces to the fire, and will cause their sides to form throat walls.

In my application for Letters Patent of the United States for improvements in furnaces filed January 3, 1889, Serial No. 295,375, I show chambers or tuyeres embodying the invention herein claimed, this being therefore a continuing application so that the record date of the present invention may be considered as January 3, 1889.

I claim—

1. An air heating chamber or tuyere formed to constitute one of a row or series of similar chambers or tuyeres extending across a furnace or fire box, said chamber having an air inlet at its lower portion, a heat absorbing face located above the air inlet, heat absorbing throat walls also located above said inlet and extending backwardly from the said face, said throat walls forming the sides of throats or passages between the chambers or the tuyeres, a plurality of outlets for the heated air, and an internal shield or deflector located between said inlet and outlets, and arranged to deflect the air entering at the inlet against the more highly heated portions of the chamber and thereby maintain a continuous air pressure thereagainst, said portions being free from internal projections tending to deflect the air away from their inner surfaces.

2. An air heating chamber or tuyere provided with an air inlet at its lower portion, a relatively narrow heat absorbing face and relatively wide or elongated heat absorbing throat walls, all located above said inlet, an internal shield or deflector arranged to deflect the air entering said inlet against the more highly heated portions of the chamber, the said throat walls being extended rearwardly from the face and deflector, and having outlet orifices arranged to diffuse the heated air through the products of partial combustion passing along the exterior of the chamber.

3. An air heating chamber or tuyere having a base adapted to rest on a support, such as the top of a bridge wall, a hollow shank projecting downwardly from said base and constituting an air inlet, a heat absorbing face and heat absorbing throat walls above said inlet, a plurality of air outlets, and an internal shield or deflector located between said inlet and outlets, and arranged to deflect the air entering at the inlet against the more highly heated portions of the chamber.

4. An air heating tuyere having a flat base formed to rest on a support such as a bridge wall, a hollow shank projecting downwardly from said base and constituting an air inlet, a chamber above said base comprising a heat absorbing face, a top, heat absorbing throat walls, and a rear wall, said throat walls and top extending rearwardly from the face and having air outlets in their rear portions, and an internal shield or deflector extending upwardly from the base partly to the top at the rear of the air inlet and in front of the air outlets, and provided with one or more flanges projecting forward toward the face, said flanges forming a contracted throat or passage between the body of the deflector and the face and top of the chamber.

5. The combination with a furnace or fire box and its bridge wall, of a plurality of air heating chambers or tuyeres located in a row upon said wall, each having an air inlet at its bottom communicating with a passage in the bridge wall, a heat absorbing face above said inlet confronting the fire space, heat absorbing throat walls extending backwardly from said face and forming the sides of throats or

flues between the chambers, a plurality of air outlets arranged to diffuse the heated air through the products of partial combustion passing over the bridge wall, and an internal shield or deflector located between said inlet and outlets, and arranged to deflect the air entering at the inlet against the said face and throat walls.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 22d day of June, A. D. 1894.

FLORENTINE A. JONES.

Witnesses:
EDGAR S. HILL,
EDWARD B. MANATON.