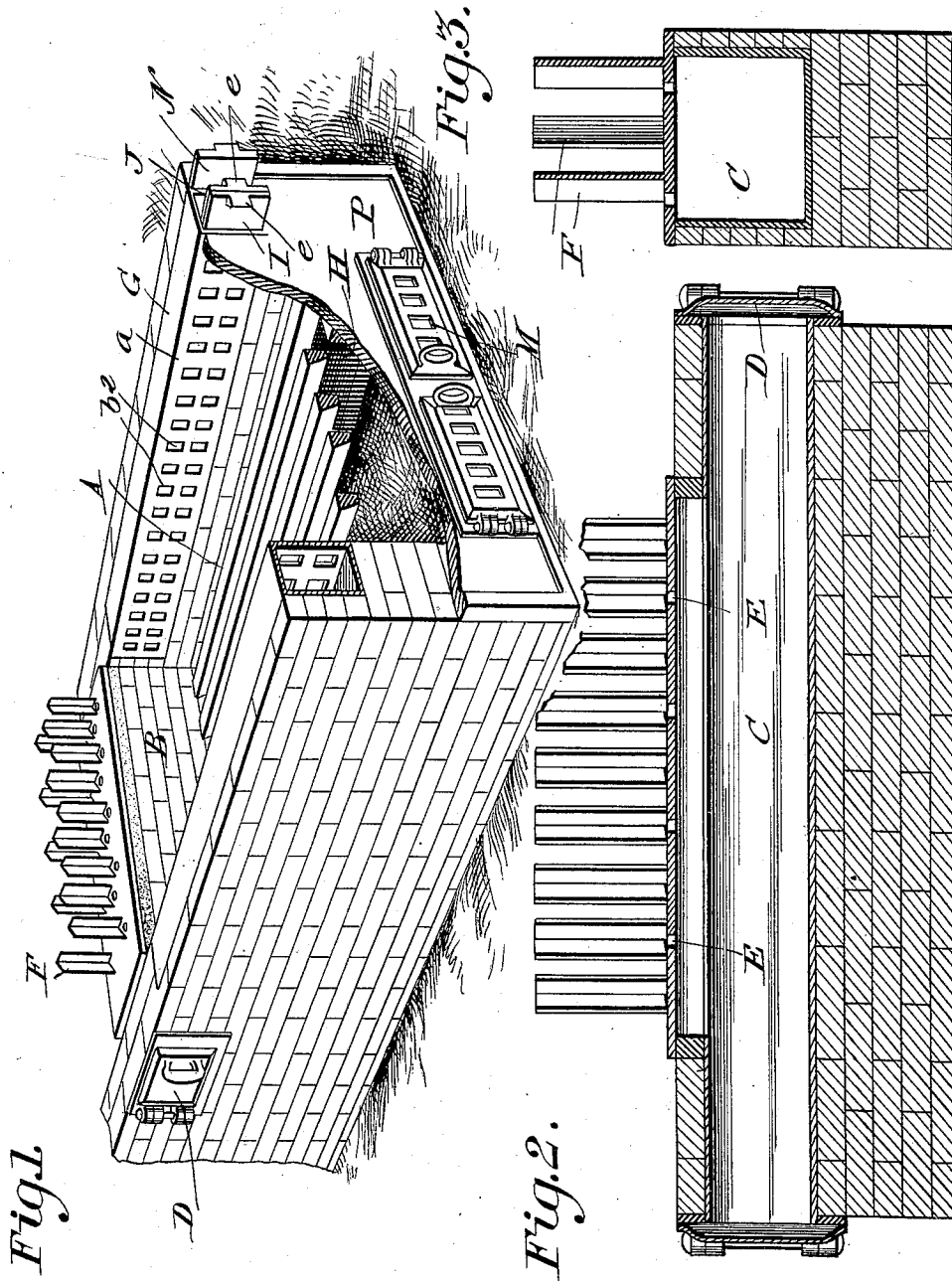


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 APPLICATION FILED NOV. 2, 1911.

1,041,761.

Patented Oct. 22, 1912.

2 SHEETS—SHEET 1.



WITNESSES

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INVENTOR

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Fig. 4.

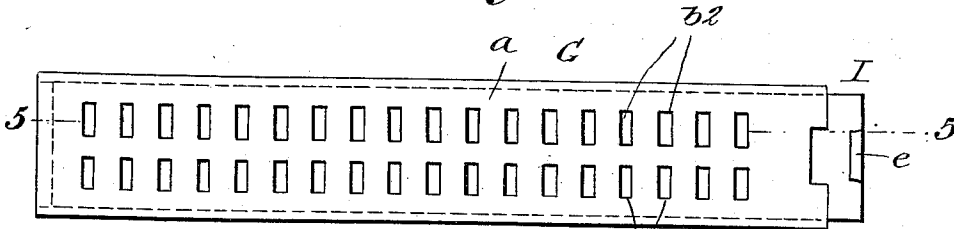


Fig. 5.



Fig. 6.

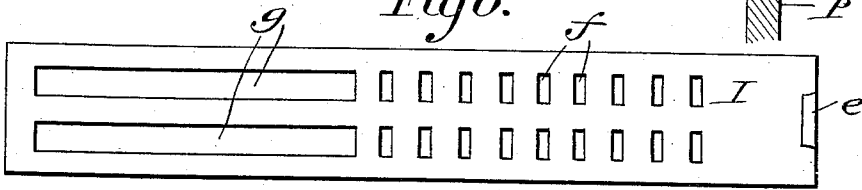
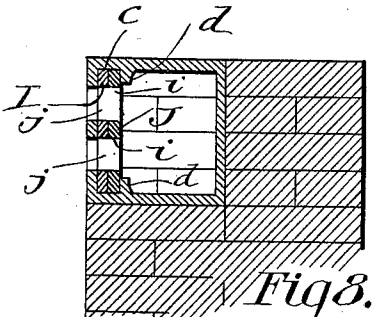
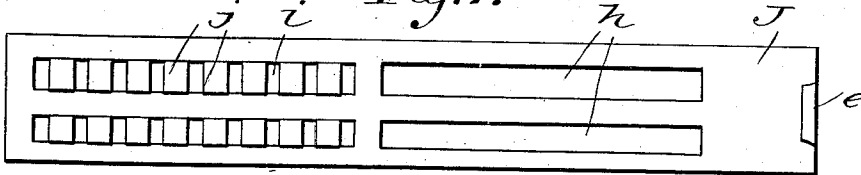


Fig. 7.



WITNESSES.

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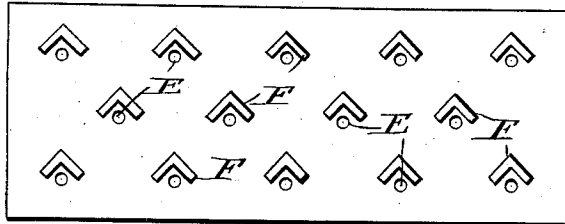


Fig. 9.

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UNITED STATES PATENT OFFICE.

WILLIAM W. EVANS, OF SALT LAKE CITY, UTAH.

MEANS FOR FEEDING AIR TO FURNACES.

1,041,761.

Specification of Letters Patent.

Patented Oct. 22, 1912.

Application filed November 2, 1911. Serial No. 658,220.

To all whom it may concern:

Be it known that I, WILLIAM W. EVANS, citizen of the United States, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented new and useful Improvements in Means for Feeding Air to Furnaces, of which the following is a specification.

My present invention pertains to means for feeding air to furnaces with a view of contributing to the complete consumption of products of combustion.

One of the objects of the invention is the provision of simple means susceptible of being quickly and easily installed and constructed in such manner that an operator is enabled to control the air at the points where the air enters the furnace or fire-box, this in order to assure the mixing of the volatile gases in the products of combustion with the oxygen, which mixture is essential to perfect consumption of the gases and other products of combustion.

Another object of the invention is the provision in a furnace of means whereby the draft in the stack or uptake is enabled to draw air upward from a chamber in communication with the atmosphere and assure the thorough commingling of such air with the products of combustion incidental to the passage of the latter over the fire or bridge wall of the furnace.

Other advantageous characteristics of the invention will be fully understood from the following description and claims when the same are read in connection with the drawings, accompanying and forming part of this specification, in which:

Figure 1 is a perspective view, partly in section and partly broken away, of so much of a furnace as is necessary to illustrate the best practical embodiment of my invention that I have as yet devised. Fig. 2 is an enlarged detail vertical section taken through the air chamber in the fire or bridge wall in the direction of the length of said chamber. Fig. 3 is a detail view of the same taken at a right angle to Fig. 2. Fig. 4 is an elevation showing the apertured inner wall of one of the air chambers at opposite sides of the fire-box and also showing the regulating slide adjacent said wall. Fig. 5 is a horizontal section taken in the plane indicated by the line 5-5 of Fig. 4. Fig. 6 is an elevation of the regulating slide that is arranged next to the inner side wall of each

side air chamber. Fig. 7 is an elevation of the slide between which and the inner side wall of the chamber the slide shown in Fig. 6 is interposed. Fig. 8 is a transverse section taken in the plane indicated by the line *a-a* of Fig. 5. Fig. 9 is a plan view showing the portion of my improvements that is disposed on the fire or bridge wall of the furnace.

Similar letters designate corresponding parts in all of the views of the drawings, referring to which:

A is the fire-box of a furnace.

B is the bridge or fire wall of the furnace, and C is a chamber disposed in and extending lengthwise of the said bridge or fire wall. The said chamber C is shown in Fig. 2 as extending through the side walls of the furnace, and as having doors D at its ends so that when desired both ends of the chamber may be placed in direct communication with the atmosphere. I would, however, have it here understood that without involving departure from the scope of my claimed invention, one end of the chamber C may be permanently closed in suitable manner in which event the chamber would have but one end adapted to be put in communication with the atmosphere and but one door for controlling the said end.

In its top the chamber C is provided with a plurality of vertically disposed apertures E, and each of these apertures is arranged in front of an upright baffle plate F of V-shape in horizontal section, Figs. 1, 2 and 9. Each of the said baffle plates F is upright and of V-shape in horizontal section throughout its length, and the concavity at the front of each is open at its upper end. By virtue of this provision it will be understood that the draft in the smoke stack or uptake, not shown, will draw air from the chamber C in jets through the apertures E and up through the concave forward sides of the baffle plates and rearward over the upper ends of said plates. It will also be understood that the unconsumed gases from the fire-box will be received in the concavities of the baffle plates and there commingled with the air, after which the commingled air and gas will pass upward and rearward over the upper ends of the baffle plates. Some of the unconsumed gases from the fire-box will also travel through the mesh of baffle plates and be commingled with some of the air from the chamber C. Con-

sequently it will be observed that practically all of the gases that pass to the bridge or fire wall will be effectually consumed before they leave the vicinity of said bridge or wall.

5 While I prefer to make the baffle plates F of V-shape or right-angle form in cross-section, I do not desire to be understood as confining myself to baffle plates of any particular shape, inasmuch as the said plates
10 may be of any suitable shape in horizontal section that will afford concavities at the forward sides of the plates, without involving departure from the scope of the invention as claimed.

15 I would also direct attention to the fact that because of the chamber C being arranged in the bridge or fire wall B, and in proximity to the fire in the fire-box, the air supplied through the apertures E will be
20 in a heated state, and that this also will contribute to the complete and perfect consumption of the gases and other products of combustion.

The side air chambers G of my improved
25 air-feeding means are arranged in the side walls of the fire-box A with their inner sides flush with the inner sides of said side walls and their bottom walls about two courses of bricks above the grate H. In the
30 inner side wall *a* of each chamber G are two (more or less) rows of apertures *b*², and within each of said chambers is a guideway *c* formed between the inner side wall and lower and upper ribs *d*, Fig. 8, spaced there-
35 from. Each of the said guide-ways *c* receives a slide I that is arranged next to the inner side wall of the chamber, and a slide J that is interposed between the slide I and the ribs *d*. The said slides I and J are
40 provided at their forward ends with handles *e* so that they can be conveniently manipulated, and the slide I is provided in its forward portion with two (more or less) rows of apertures *f*, while its rear portion
45 has two (more or less) longitudinal slots *g* formed in it. The slide J has two (more or less) longitudinal slots *h* formed in its forward portion, and two (more or less) rows of apertures *i* in its rear portion; and it is
50 also provided with lateral projections *j*, arranged intermediate the apertures *i*, and designed to rest and be moved in the slots *g* of the slide I.

Each slide I can be operated independ-
55 ently of the adjacent slide J and vice versa, and by reference to Fig. 5 it will be manifest that the openings in the slides are so disposed that by manipulation of the slides the openings *b*² may be opened or closed as
60 desired, and the amount of air supplied the fire-box through the chambers G controlled. For instance by moving the slides I, the openings *b*² in the forward portions of the chambers G can be opened or closed, while
65 by moving the slides J, the openings *b*² in

the rear portions of the chambers G can be opened or closed. Again by adjusting both the slides I and the slides J, all of the openings *b*² can be entirely closed or fully opened, in the discretion of the fireman, or can all
70 be closed to a desired extent according to the condition of the fire in the box A.

By virtue of the slides I and J in combination with the perforated walls of the chambers G, the fireman is enabled to control the air at the places where it enters the
75 furnace, this being necessary in order to bring about a thorough mixture of the volatile gases and oxygen and maintain perfect combustion.

Experiment with an ordinary furnace lacking my improvements has demonstrated that when the furnace heat is at the combustion point and fresh coal is thrown into the fire-box, the generation of volatile gases
85 is started at once by the furnace heat augmented by the fact that the ash pit doors are opened. Consequently there is imperfect combustion due to the lack of oxygen to mix with the rapidly rising volatile gases,
90 and the result is black smoke. When, however, my improvements are properly installed and manipulated, the volatile gases will be consumed from the time of starting a fresh fire, and after such consumption all
95 of the apertures *b*² can be closed, whereupon when the ash pit doors M are opened, the heat can be extracted from the fixed carbon that is left in the live coals on the grate bars.

In all three parts of my novel apparatus,
100 it will be noted that atmospheric pressure coöperates with the draft in the smoke stack or uptake in adequately supplying jets of air to the products of combustion; also, that the jets of air are heated precedent to being
105 discharged into the fire-box, this latter because of the chambers C and G being adjacent the fire-box.

In the preferred embodiment of my invention, doors, similar to the door N of Figs.
110 1 and 5, are hinged to the face plate P of the furnace adjacent the forward ends of the chambers G and are used, as occasion demands, to open and close communication between the atmosphere and the interiors of
115 the chambers G.

In addition to the practical advantages hereinbefore ascribed to my novel furnace, it will be noted that my novel apparatus is simple and adapted to be readily installed,
120 and that while the apparatus is highly efficient in operation, it embodies no delicate parts such as are liable to get out of order after a short period of use.

I have entered into a detailed description
125 of the construction and relative arrangement of the parts comprised in the present and preferred embodiment of my invention in order to impart a full, clear, and exact understanding of the said embodiment. I do
130

not desire, however, to be understood as confining myself to the said specific construction and relative arrangement of parts, as such changes or modifications may be made in practice as fairly fall within the scope of my claimed invention.

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

10 1. In means for feeding air to furnaces, the combination with the fire-box of a furnace, of an air chamber arranged in a wall of the fire-box and having apertures in its inner side, at intervals of its length, and an
15 end adapted to be put into communication with the atmosphere and also having longitudinal ribs spaced from said inner side, a slide arranged in the chamber and against the inner side thereof and having apertures
20 at intervals of its length, the series of said apertures extending to a point adjacent one of its ends, and also having a longitudinal slot disposed between the series of apertures and its opposite end, and a slide arranged at
25 the opposite side of the first-named slide, with reference to the inner side of the chamber, and having apertures at intervals of its length disposed opposite the longitudinal slot of the first-named slide and also having
30 a lateral projection disposed and movable in said slot and further having a longitudinal slot disposed opposite the series of apertures of the first-named slide.

2. In means for feeding air to furnaces, the combination with the fire-box of a furnace, of an air chamber arranged in a wall of the fire-box and having apertures in its inner side at intervals of its length and also having an end adapted to be connected with
40 the atmosphere, a slide arranged in the

chamber and against the inner side thereof and having apertures at intervals of its length, the series of said apertures extending to a point adjacent one of its ends, and also having a longitudinal slot disposed intermediate the series of apertures and its opposite end, and a second slide arranged at the opposite side of the first-named slide, with reference to the inner side of the chamber, and having apertures at intervals of its length disposed opposite the longitudinal slot of the first-named slide and also having a longitudinal slot disposed opposite the series of apertures of the first-named slide.

3. In means for feeding air to furnaces, the combination with the fire-box of a furnace, of an air chamber arranged in a wall of the fire-box and having apertures in its inner side, at intervals of its length, and also having an end adapted to be connected with the atmosphere, and slides adjustable independently of each other; the said slides being arranged side by side and close together and also close to the inner side of the chamber and having apertures so relatively arranged that adjustment of one slide relative to the other will jet air into the portion of the fire-box adjacent the open end of the chamber, only, and adjustment of the other slide relative to the first mentioned slide will jet air into the portion of the fire-box remote from said end, only.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM W. EVANS.

Witnesses:

GEO. F. GOODWIN,
ARLINE ROSE.