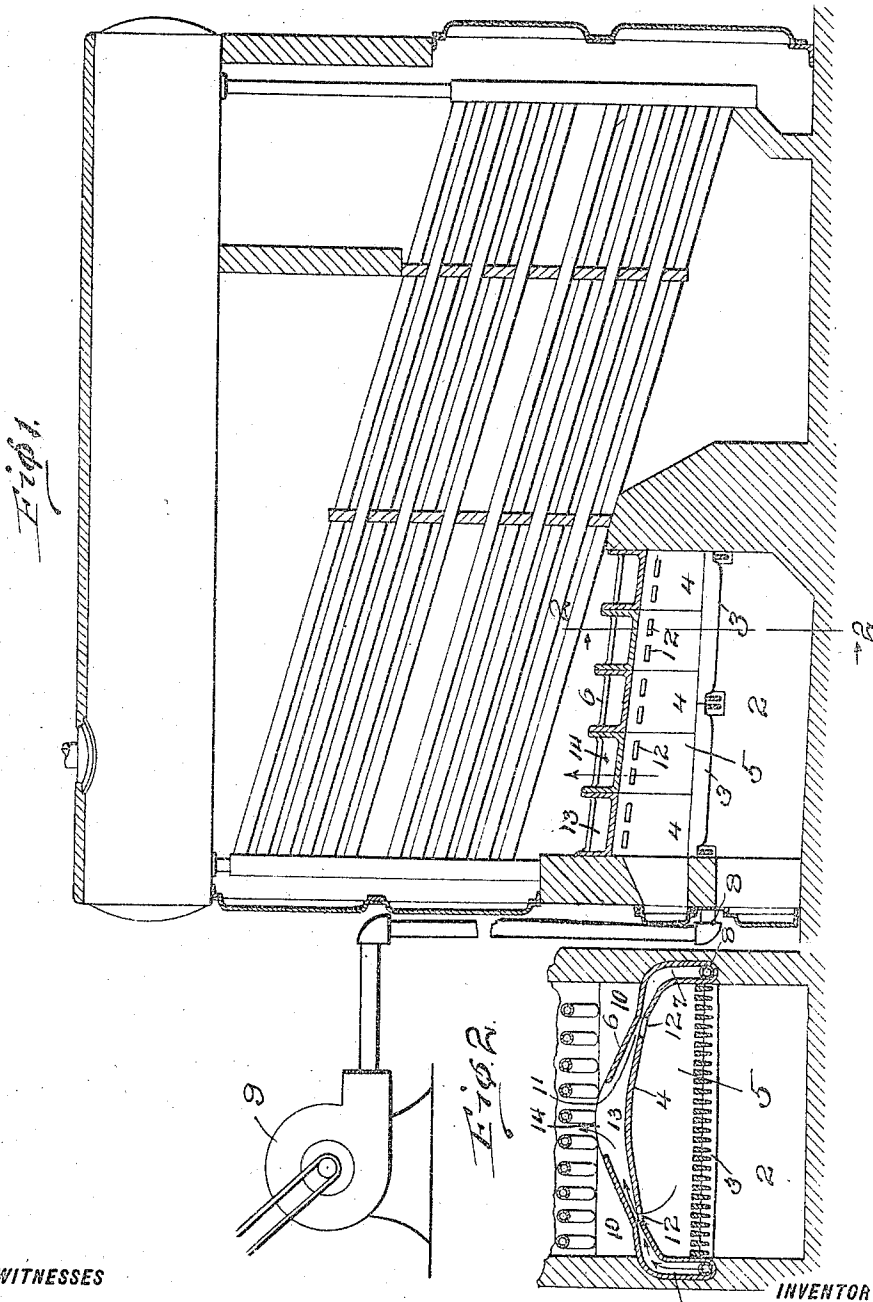


M. R. MACHOL.
FURNACE.

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1,013,793.

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WITNESSES

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FURNACE.

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To all whom it may concern:

Be it known that I, MORRIS R. MACHOL, a citizen of the United States, residing at Staten Island, in the county of Richmond and State of New York, have invented certain new and useful Improvements in Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in furnaces and to means for mixing air with the combustible gases from the furnace so as to produce complete combustion and includes a novel means for introducing air under pressure to assist combustion as will be hereinafter set forth.

More particularly the invention relates to means for changing air pressure into an atomizing blast to produce a suction in the manner of air injectors or atomizers, by means of this suction to draw the gases from the fire chamber into a secondary chamber where they are thoroughly mixed with the air which is at a high velocity and which produces the suction and means for regulating the mixture so as to produce complete combustion.

In the accompanying drawings: Figure 1 is a vertical longitudinal section through a furnace embodying the invention. Fig. 2 is a section through Fig. 1 approximately on line 2-2.

Fig. 1 shows a boiler of any desired kind having a furnace with an ash pit 2 and grate bars 3. Over the grate bars is an arch made of brick or other suitable material 4. Over this arch is another arch 6. At the side or front between the two arches of the fire chamber is an air chamber 7 with an entrance at a pipe 8 connected with a blower 9 shown in Fig. 1. The exit from this chamber is at the point 10 where the two arches gradually approach each other to form a small orifice 11, immediately beyond this orifice 11 in the lower or inner arch 4 are holes or slots 12 through which the gases from the furnace are drawn. The two arches then gradually diverge forming secondary combustion chambers 13 with an exit 14 in which the now thoroughly mixed gases burn in a manner similar to a blow-pipe.

In the drawing is disclosed an arrangement for the application of air under pres-

sure in such manner as to utilize air pressure to form an atomizing blast next to the fire chamber, the atomizing blast being arranged adjacent one or more apertures or other openings in one of the walls of the fire chamber for drawing gases and the like from the fire chamber and mixing therewith. The apertures in the walls of the fire chamber and the atomizing blast are arranged so that the air and the matter from the fire chamber will be mixed and projected into a combustion chamber, whereby greater heat and more thorough utilization of the fuel are attained.

The above mentioned objects can all be obtained not only by means of air under pressure in the pressure chamber I have described and which constitutes a new method of draft but also with any of the existing methods of draft, namely boiler or fire room under pressure, ash pit under pressure induced draft by means of fan or jet in stack or by natural draft of stack or chimney.

What I claim is:—

1. In a furnace, a fire chamber, an arch over said fire chamber formed with orifices near each end thereof, means spaced on each side of said arch and extending over the arch and arranged to approach said arch at the orifices therein, thus forming restricted openings, whereby chambers containing air pressure are formed, and means for providing said chambers with air under pressure, said air under pressure being designed to escape through said restricted openings and mixing with the products of combustion from the fire chamber.

2. In a furnace, a fire chamber, an arch formed with orifices therein, means placed on the sides of said arch and extending therefrom and approaching said arch near said orifices thus forming a chamber between said means and said arch, and means for extending said first mentioned means whereby the same approaches said arch in such a direction as to partially inclose a space above said arch, said space defining a mixing chamber, (or combustion chamber), and means for forcing air into said first mentioned chamber, which air is designed to escape therefrom at the point where the means defining the chamber approaches the arch, whereby gases are drawn from the fire chamber and mixed with the air in said mixing chamber.

3. In a device of the character described, a furnace formed with a fire chamber, an arch above said fire chamber provided with orifices for the passage of gases from said fire chamber, a second arch arranged above said first mentioned arch and formed so as to approach said first mentioned arch near the orifices of said first mentioned arch, whereby a restricted opening is provided between said arches for causing the pressure in the chamber formed between the arches to force a jet of air through said restricted opening past the orifices in said arch.

4. In a device of the character described, a furnace formed with a fire chamber a plurality of arches arranged over the fire chamber, part of said arches forming a combustion chamber the lower arch having orifices arranged therein for forming a passageway for the gases to pass from the fire chamber into the combustion chamber, the upper arch being so constructed as to approach the lower arch at the orifices in the lower arch for defining openings, and means for supplying air between said arches, which air is designed to pass into said combustion chamber through said openings and to draw gas from said fire chamber and mix therewith, the position of the orifices being so arranged as to utilize the velocity of the air retained at such restricted openings between said arches to produce a suction after the manner of an injector for thoroughly drawing gases from said fire chamber and commingling therewith.

5. In a device of the character described, a furnace formed with a fire chamber a plurality of superimposed converging arches over said fire chamber, the lower arch having orifices opening into the fire chamber for providing a passageway between the fire chamber and combustion chamber, said combustion chamber being formed by the upper part of said superimposed converging arches, the lower part of said arches defining an air space, said orifices in said lower arch being the only exits from the fire chamber for the passage of gases into the combustion chamber, said orifices being located adjacent the point of convergence of said arches, the converging of said arches forming a restricted opening between the arches at said orifices for causing the utilization of the velocity of air as the same

passes from the air chambers into the combustion chamber, whereby the gases in the fire chamber are drawn therefrom after the manner of an injector and mixed with the air as the same is forced into the combustion chamber.

6. A furnace having a fire chamber, a pair of superimposed arches arranged over said fire chamber and extending on each side thereof, said arches being formed so as to approach each other near each side and from said points of approach extending apart for defining a combustion chamber and an air heating chamber on each side of said fire chamber, means for forcing air under pressure into said air heating chambers, and from thence into said combustion chamber, the approaching of the arches near each side thereof forming restricted openings through which said air must pass when passing from said air heating chamber to said combustion chamber, said lower arch being formed with orifices near the point where the upper arch approaches the same, whereby when air is forced from said air heating chambers into said combustion chamber through said restricted openings the pressure of the air is converted into velocity for producing an atomizing blast for drawing and mixing gases from said fire chamber and projecting the same into said combustion chamber.

7. A furnace having a fire chamber, a pair of superimposed arches for defining a combustion chamber, and a pair of air heating chambers, one of said arches being formed with orifices opening into said fire chamber, said orifices being the only exits for the passage of gases from said fire chamber, said arches being arranged to converge near the point where said orifices are located for producing a restricted opening for said air heating chambers near said orifices, whereby the air pressure in said air heating chambers is converted into an atomizing blast which is arranged to pass said orifices for drawing the gases from the fire chamber through said orifices and mixing therewith, and means for supplying air under pressure to said air heating chamber.

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

MORRIS R. MACHOL.

Witnesses:

HUGO MOCK,
M. SCHAAF.