J. JENKS.

DEVICES FOR HEATING AND FEEDING AIR TO FURNACES.

No. 188,914. Patented March 27, 1877.

Fig. 1.

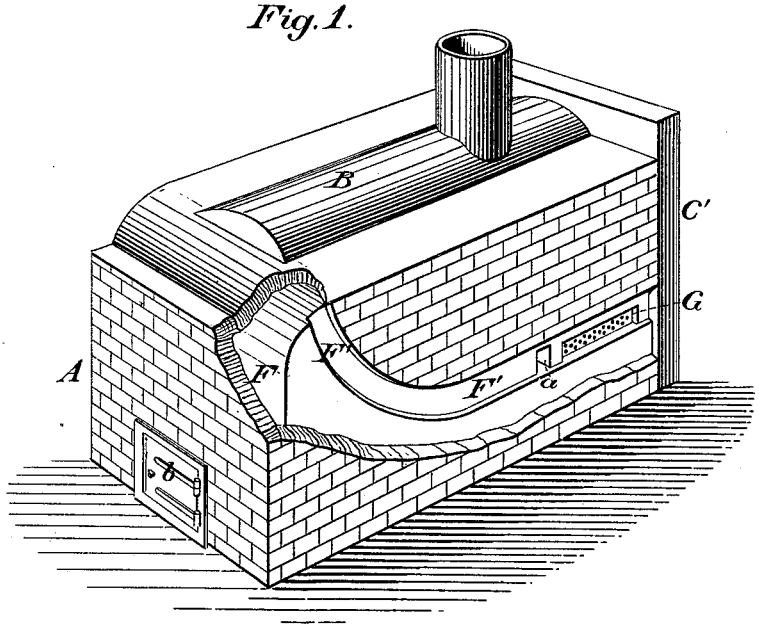


Fig. 2.

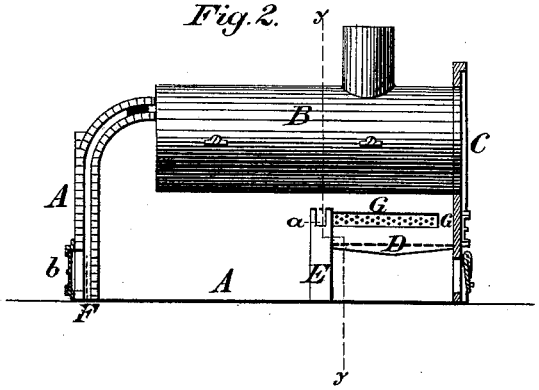
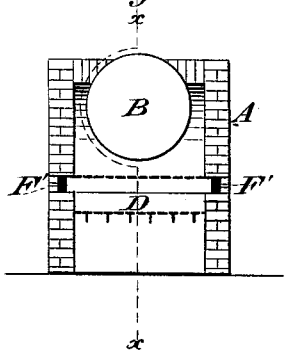


Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES JENKS, OF DETROIT, MICHIGAN, ASSIGNOR OF ONE-HALF HIS RIGHT TO GEORGE A. JENKS, OF SAME PLACE.

IMPROVEMENT IN DEVICES FOR HEATING AND FEEDING AIR TO FURNACES.

Specification forming part of Letters Patent No. **188,914**, dated March 27, 1877; application filed October 31, 1876.

To all whom it may concern:

Be it known that I, JAMES JENKS, of Detroit, in the county of Wayne and State of Michigan, have invented an Improvement in Boiler-Furnaces, of which the following is a specification:

The object I have in view is to so construct the arch and furnace of a steam-boiler of the stationary variety as to secure a more perfect combustion of the gases evolved from the fuel on the grate, which gases, especially in the consumption of bituminous coals, are evolved in large volume, requiring the admixture of a corresponding volume of oxygen to secure their combustion.

It is essential that the air-supply be admitted to the combustion-chamber at an elevated temperature, and herein is the essential feature of my invention, which consists in the combination of the rear arch, constructed hollow, as shown, and having an atmospheric air-aperture at the bottom thereof, and the curved flues, built in the sides of the furnace, with the perforated plates in the sides of the combustion-chamber above the grate, and the perforated bridge-wall, whereby the air is heated and fed to the combustion-chamber, as more fully hereinafter explained.

Preferably a perforated grate is used, and in an ash-pit that may be tightly closed, as but little air is required to support the preliminary combustion of the fuel.

Figure 1 is a perspective view of a boiler set in the arch, portions of which are broken out to show the passages. Fig. 2 is a longitudinal vertical section at *x x*. Fig. 3 is a cross-section at *y y*.

In the drawing, A represents the arch, in which the boiler B is set. C is the fire-front, provided with fire and ash-pit doors, adapted to be tightly closed, the latter especially, as it is not necessary to admit much air into the ash-pit to support the preliminary combustion of the fuel lying on the perforated plate-grate D, behind which is located the bridge-wall E, having a hollow wall or flue, *a*, extending from end to end, and communicating at the top with the interior of the furnace through perforations, or through a slot, delivering the air in jets or in a thin sheet.

The rear end wall of the arch is double, forming a chamber, F, into which atmospheric air is admitted in proper volume through a door or register, *b*, at the bottom. From the top of the chamber F, at each side, a flue, F′, is built into the side wall, turning down and extending to the front on a plane above the grate.

Opposite the furnace, and just above the grate, a perforated plate, G, is set into an opening in the flue, so as to deliver air from the flue into the side of the furnace in jets, ready to mingle with the gases as they are evolved from the fuel.

The flue *a* of the bridge-wall at each end intersects and communicates with the side flues F′.

The natural draft of the furnace causes air to be drawn into the chamber F, where it is highly heated by the flames as they impinge upon its front wall, and then pass along through the side flues, where they are heated to a still higher temperature, thence in jets into the furnace, at a temperature considerably above that of the gases, which are ignited, upon their admixture with the oxygen. A portion of the current of heated air is drawn through the bridge-wall into the furnace, and ignites any unconsumed gases passing over the bridge-wall, thereby insuring a more perfect combustion than it has hitherto been possible to obtain.

There being but little air admitted to the ash-pit to pass up through the grate, the latter is liable to burn, to avoid which a small jet of steam may be blown into the ash-pit, the moisture of which steam will protect the grates.

Ordinary grate-bars may be used, if preferred, but for burning slack or refuse coal, and similar fuels, the plate-grate is the best adapted.

What I claim as my invention is—

In a steam-boiler furnace, the rear hollow arch A, atmospheric air-aperture *b*, and curved side flues F′, in combination with the side perforated plates G, and perforated bridge-wall *a*, all arranged as shown, whereby air is heated and fed to the combustion-chamber, substantially as described.

JAMES JENKS.

Witnesses:
H. F. EBERTS,
WM. P. SPALDING.