P. J. SCHMITT.

BOILER-FURNACE.

No. 183,027. Patented Oct. 10, 1876.

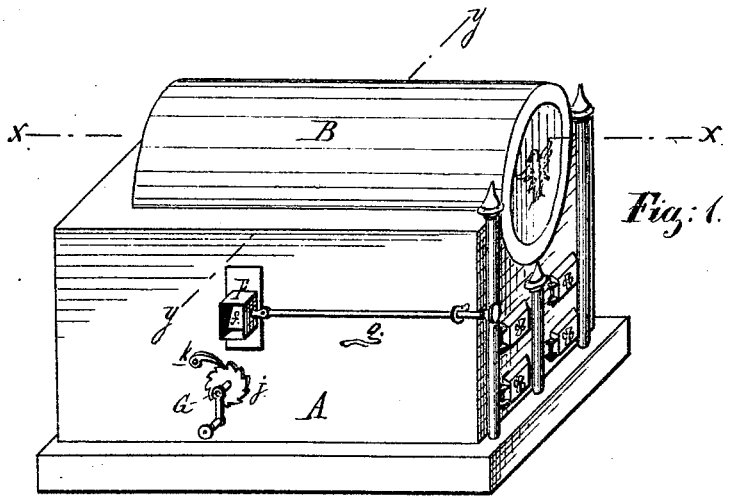

Fig: 1.

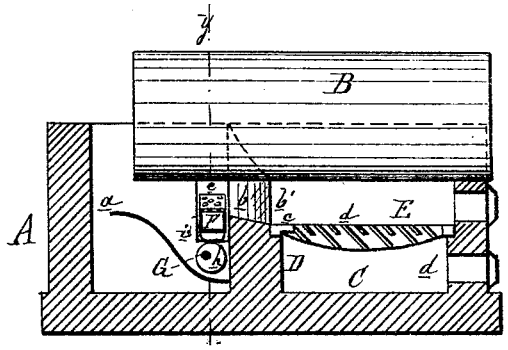

Fig: 2

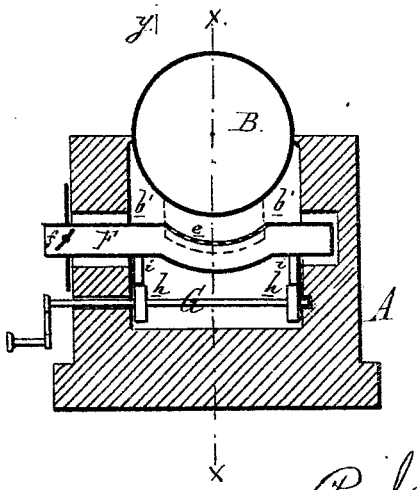

Fig: 3.

Witnesses

Edward Barthel.

Thos. S. Day.

P. J. Schmitt Inventor

By

Thos S. Sprague Attorney.

UNITED STATES PATENT OFFICE.

PETER J. SCHMITT, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN BOILER-FURNACES.

Specification forming part of Letters Patent No. **183,027**, dated October 10, 1876; application filed July 18, 1876.

To all whom it may concern:

Be it known that I, PETER JACOB SCHMITT, of Chicago, in the county of Cook and State of Illinois, have invented an Improvement in Boiler-Furnaces, of which the following is a specification:

The nature of my invention relates to an improvement in steam-boiler furnaces of that class wherein a secondary supply of fresh air is admitted to the furnace back of the bridge-wall, to promote the ignition and combustion of the gases evolved from the fuel.

To this end my invention consists in a cast-iron pipe, transversely arranged in the furnace back of the bridge-wall, adapted to deliver air in jets to the gases passing over it, in combination with means for raising said air-pipe to reduce the area of the throat of the furnace; and, further, in the combination with the air-pipe, of an inclined apron formed at the top of the bridge-wall, and the grate having diminished air-spaces, all as more fully hereinafter explained.

Figure 1 is a perspective view of a boiler and arch fitted with my improvements. Fig. 2 is a longitudinal vertical section of the same at *x x* in Fig. 3, which is a cross-section of the same at *y y*.

In the drawing, A represents the brick arch, in which a steam-boiler, B, is set. C is the ash-pit. D is the transverse bridge-wall, back of which is the combustion-chamber, filled up or lined with a curved apron, *a*, as shown. The bridge-wall, it will be noticed, is of unusual thickness, and its upper surface, while following the curvature of the boiler, forms an inclined apron, *b*, flanked at each side by a fire-brick deflecting-wing, *b'*, which wings serve to reduce the width of the throat of the furnace.

Each grate-bar E is formed with a diminished air-space, *c*, at the back end, forming a horizontal continuation to the front of the inclined apron of the bridge-wall. It is also cast with alternate long and short spacer-ribs *d*, which are so inclined as to direct the draft-currents rising through the grate backward toward the bridge-wall.

F is a cast-iron air-box transversely arranged in the furnace, behind the bridge-wall, whose curvature it follows, with one end extending through the side of the arch, where it is fitted with a valve, *f*, for regulating the volume of air to be admitted to the furnace, which valve is operated by a rod, *g*, extending to the front of the arch. The upper surface of the box in the throat of the furnace is perforated with numerous small apertures, *e*, from which the air will issue in jets.

Under the air-box a shaft, G, is transversely journaled in the arch, projecting through one side thereof, and carrying two eccentrics, *h h*, upon which two lugs, *i i*, pendent from the air-box, rest, to support the latter. Its outer end is provided with a crank, with which to turn it, and with a ratchet, *j*, with which engages a pawl, *k*, to hold it in the position in which it may be left.

In firing with bituminous coal, the latter is laid on the grate, and allowed to burn until coked, or the smoke and gases nearly or quite driven off, when a fresh supply is thrown on the grate, first, however, pushing back the incandescent fuel onto the dead-plate and apron of the bridge-wall. Then as the smoke and gases evolved from the fresh fuel pass over the incandescent fuel behind, they are ignited, and by the admixture of the fresh-air supply, perfect combustion will result, no fuel being wasted in the form of unconsumed carbon passing off as smoke.

If, from the strength of the draft, the quality of the fuel, or the state of the fire, it becomes necessary to reduce the area of the furnace-throat, it is easily done by turning the eccentric-shaft so as to raise the air-box to the required height above the bridge-wall.

The volume of air admitted into the air-box may also be regulated to the requirements of the furnace by means of the valve.

What I claim as my invention is—

1. The combination, with the air-box F and the bridge-wall, of a means for raising said air-box to reduce the area of the throat, substantially as described.

2. The combination, with the air-box F, of the inclined apron *b*, formed at the top of the bridge-wall, and a grate with diminished air-spaces *c* at the back, substantially as described.

PETER JACOB SCHMITT.

Witnesses:

WM. H. LOTZ,

EMIL H. FROMMANN.