T. KING, Jr.

BRIDGE WALL ATTACHMENT FOR FURNACES.

No. 187,391. Patented Feb. 13, 1877.

Fig. 1

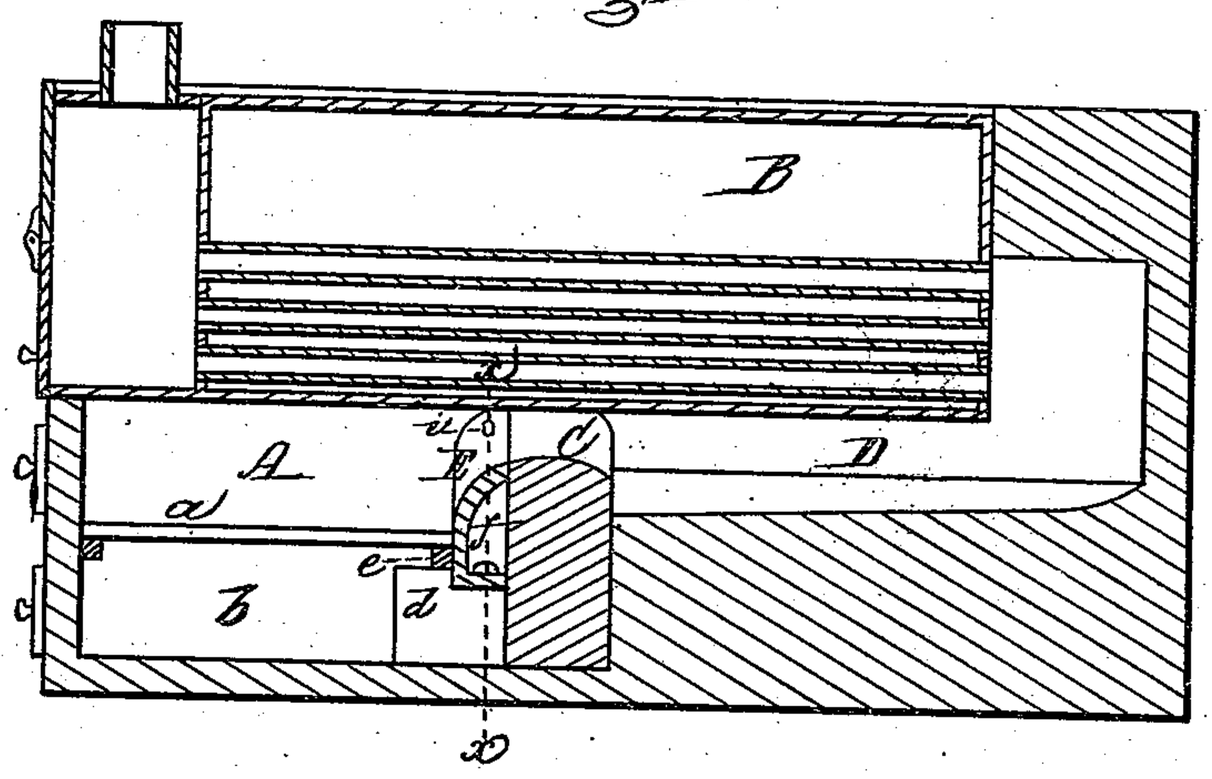


Fig. 2.

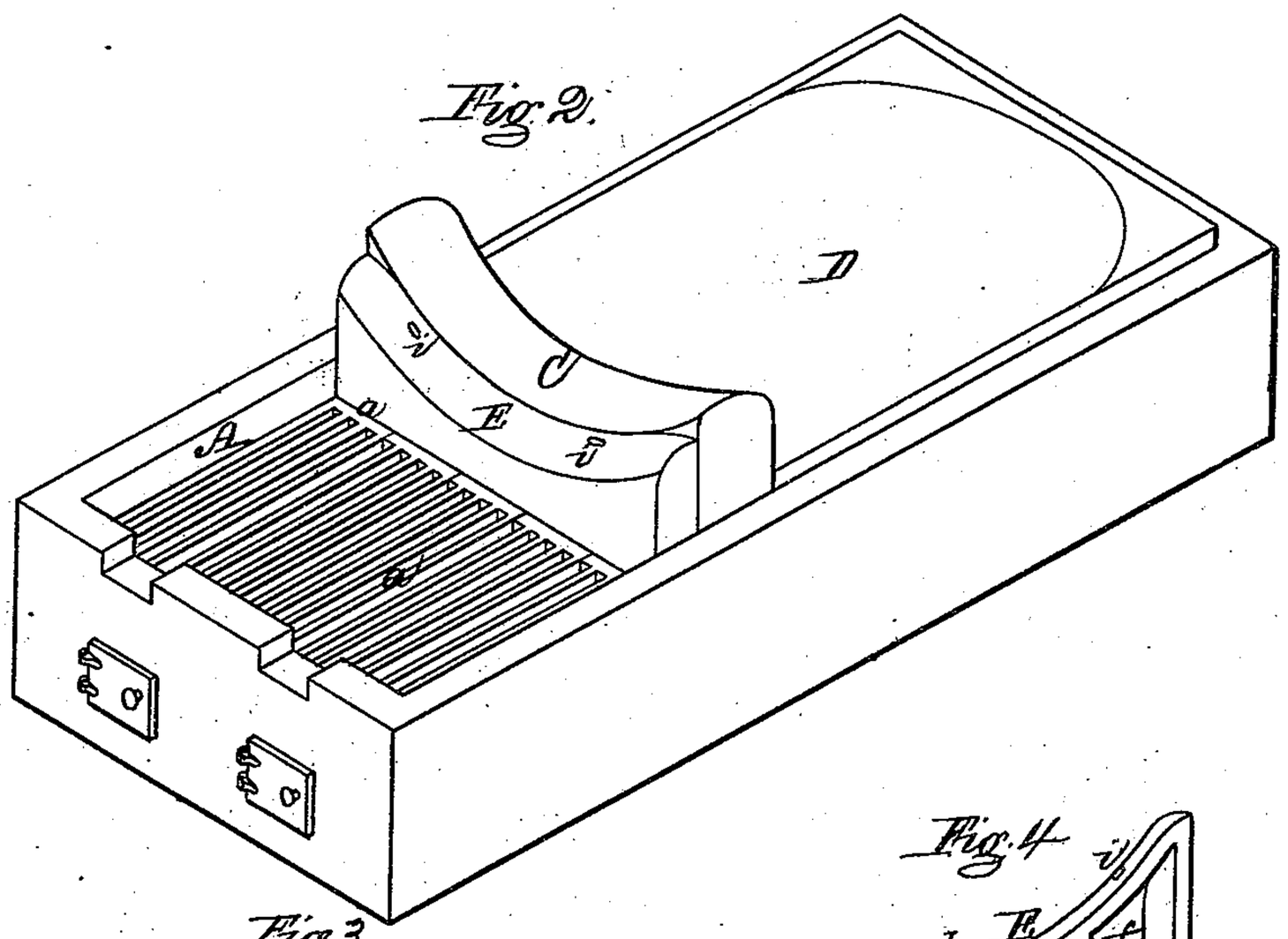


Fig. 3.

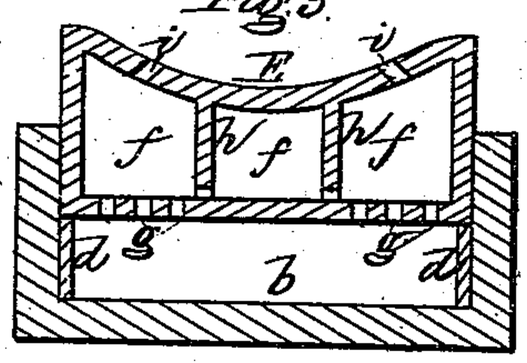
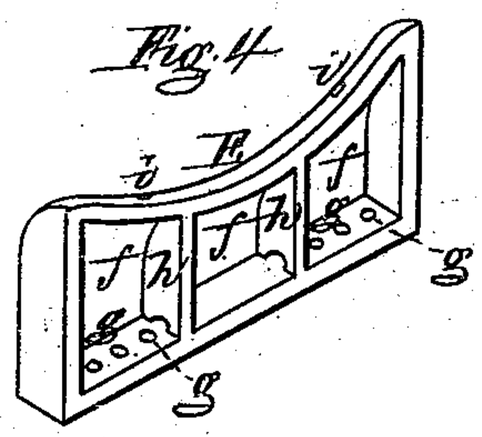


Fig. 4



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Attys.

UNITED STATES PATENT OFFICE

THEOPHILUS KING, JR., OF QUINCY, ASSIGNOR TO HIMSELF AND CHARLES B. BRYANT, OF STONEHAM, MASSACHUSETTS.

IMPROVEMENT IN BRIDGE-WALL ATTACHMENTS FOR FURNACES.

Specification forming part of Letters Patent No. **187,391**, dated February 13, 1877; application filed December 30, 1876.

To all whom it may concern:

Be it known that I, THEOPHILUS KING, Jr., of Quincy, in the county of Norfolk and State of Massachusetts, have invented an Improvement in Smoke-Condensing Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a longitudinal vertical section through a steam-boiler and its furnace, constructed in accordance with my invention. Fig. 2 is a perspective view of the interior of the furnace, the boiler and upper portion of the brick-work being removed. Fig. 3 is a transverse vertical section on the line *x x* of Fig. 1. Fig. 4 is a perspective view of the removable metallic plate, within which is formed the air-chamber.

In smoke-consuming furnaces, in which the bridge-wall is provided with flues or interior passages communicating with the external air and with a series of discharge-orifices, considerable difficulty is experienced on account of the inaccessibility of these flues in keeping them clear of the dirt, ashes, &c., with which they become obstructed.

My invention has for its object to simplify the construction of smoke-consuming furnaces and render the air-flues more easily accessible than heretofore, and consists in a removable metallic plate, provided with an air-chamber, and placed immediately in front of the bridge-wall, the air being admitted to the chamber from beneath, and being discharged through suitable orifices in the top of the plate, so as to impinge upon and become thoroughly commingled with the smoke and gaseous products of combustion as they pass over the bridge-wall, thus insuring their perfect ignition and consumption.

To enable others skilled in the art to understand and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawings, A represents the furnace; B, the boiler; *a*, the grate-bars; *b*, the ash-pit; C, the bridge-wall, constructed of fire-brick in the usual manner; and D, the combustion-chamber. E is a metallic plate, (preferably made of cast-iron,) which is placed immedietely in front of the bridge-wall C, so as to fit snugly against the front face thereof, the plate E resting upon, and being supported in place by, ledges *d* on each side of the furnace; the cross-piece *e*, upon which the rear ends of the grate-bars rest, being also supported by these ledges *d*. The upper portion of the plate E is curved to correspond to the form of the bridge-wall, and its edge is also curved or rounded transversely, as seen in Fig. 2. Within the plates E, and extending longitudinally from one end to the other thereof, is formed an air-chamber, *f*, which is open at the rear side, as seen in Fig. 4, its rear wall (when in place) being formed by the front face of the bridge-wall C against which it rests. At the bottom of the plate E are a series of inlet openings, *g*, through which the air from the ash-pit beneath is admitted to the chamber *f*, the ribs *h* (which serve to strengthen the plate and prevent it from warping) being perforated to allow the air to pass freely from one end of the chamber to the other. At the top of the plate E, and communicating with the air-chamber *f*, are discharge-apertures or air-passages *i i*, the sides of which are preferably inclined upward at an angle of about forty-five degrees, and also slightly inward toward the combustion-chamber D; and from these apertures the air (partially heated within the chamber *f*) issues in streams or jets, and impinges upon and becomes thoroughly commingled with the smoke and gaseous products of combustion as they pass over the top of the bridge-wall C into the chamber D, as is necessary to insure their perfect ignition and consumption.

It will be seeen that the passage of the air through the plate E will tend to cool it, and prevent its rapid destruction by the heat to which it is exposed. By thus placing a removable metallic plate, provided with an air-chamber and inlet and outlet openings in front of the bridge-wall, instead of forming the latter with air-flues and discharge-orifices as heretofore, the construction is greatly simpli-

fied, and the cost of the furnace reduced. The most important advantage, however, resulting from the employment of the removable plate E, is the great facility which it affords for freeing the chamber and air-passages of any dirt or ashes with which they may become clogged, it being merely necessary to remove the plate to gain easy access to its interior, and after cleaning it replace it as before, all of which can be done in a very short space of time and with very little labor; whereas, in order to clean out the air flues or passages formed within a bridge-wall constructed of brick, it often becomes necessary to remove the greater portion of the wall and build it anew.

My removable plate adds very little to the cost of a new furnace, while it may be readily applied to a bridge-wall already constructed at a very small expense, and can be used in connection with furnaces of various descriptions.

What I claim as my invention, and desire to secure by Letters Patent, is—

The removable metallic plate E, provided with an air-chamber, *f*, provided with the inlet *g* and the outlet *i*, in combination with, and located immediately in front of, the bridge-wall C, substantially in the manner and for the purpose set forth.

Witness my hand this 27th day of December, A. D. 1876.

THEOPHILUS KING, JR.

In presence of—

P. E. TESCHEMACHER,

GEO. T. ROBINSON.