(No Model.)

W. KEARNEY.

FURNACE DOOR.

No. 374,190. Patented Dec. 6, 1887.

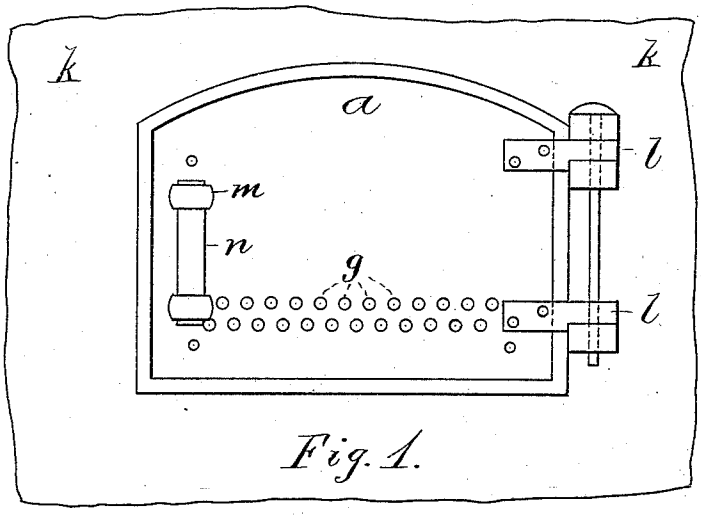


Fig. 1.

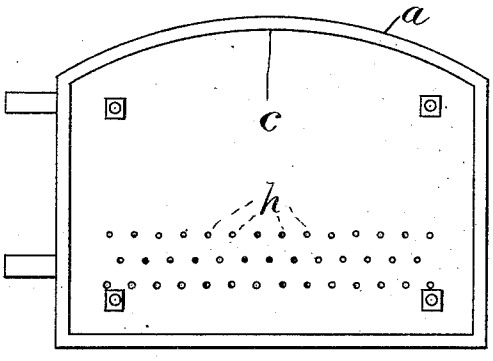


Fig. 2.

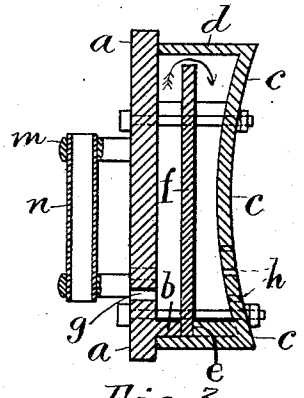


Fig. 3.

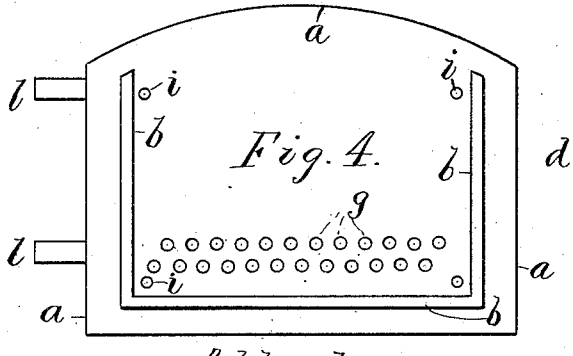


Fig. 4.

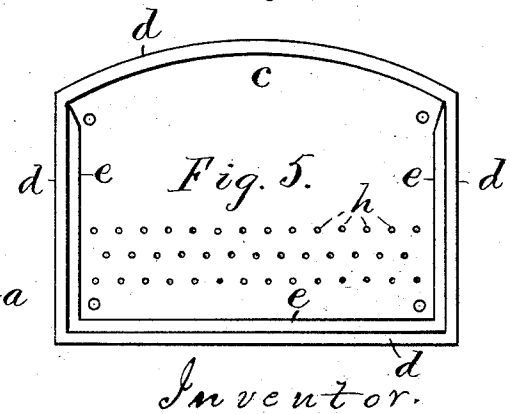


Fig. 5.

Attest:
L. Lee.
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N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM KEARNEY, OF BELLEVILLE, NEW JERSEY.

FURNACE-DOOR.

SPECIFICATION forming part of Letters Patent No. 374,190, dated December 6, 1887.

Application filed March 25, 1887. Serial No. 232,353. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM KEARNEY, a citizen of the United States, residing at Belleville, Essex county, New Jersey, have invented certain new and useful Improvements in Furnace-Doors, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of this invention is to furnish a furnace-door that shall be simple in form, easily constructed, and adapted to stand long exposure to the heat without being distorted.

The construction consists in an air-box cast separately and fixed to the inner side of the door and a vertical partition within the air-box to deflect the air upward. Holes are formed in the door near the bottom of the partition and in the inner side of the air-box near the bottom, and the face of the air-box next to the fire is concaved toward the door, to compensate for the expansion induced by the heat, and which commonly bulges such exposed plate toward the fire.

In the annexed drawings, Figure 1 is an outside view of a furnace-door embodying my invention, showing a part of the door-frame in connection therewith. Fig. 2 is an inside view of the same without the frame; Fig. 3, a vertical section of the same through Fig. 1; Fig. 4, an elevation from within the air-box of the door-plate, and Fig. 5 an inside view of the air-box.

a is the door plate; *b*, three ribs attached to its inner face, one being horizontal and the other two vertical at their ends.

c is the air-box plate, and *d* are flanges projecting from the edges of the same and fitted around the ribs *b* upon the door-plate.

e are ledges on the inner faces of the air-box plate.

The air-box is divided by a partition, *f*, held between the ribs *b* and the ledges *e*. Holes *g* are formed in the door near the bottom of the partition and holes *h* in the inner side of the air-box near the bottom, and the inner plate, *c*, or face of the air-box next to the fire is concaved toward the door to compensate for the expansion induced by the heat, and which commonly bulges such exposed plates toward the fire. The air entering the holes *g* is deflected upward by the partition *f*, and, passing over the top of the same, moves downward in contact with the concave plate *c*, thus cooling the entire surface of the latter in the desired manner. The air then enters the furnace through the holes *h*, being discharged, by the location of the holes, close to the surface of the heated fuel, thus driving the heated gases away from the plate while promoting the combustion. Both plates are provided with bolt-holes *i* and bolts *j*, inserted within the same to clamp them together.

k is the door-frame, and *l* are the hinges of the door.

By reference to the drawings it will be noticed that the number of the holes *h* in the air-box plate exceeds that of the holes *g* in the door-plate, while their united area is less. The heating of the air within the air-box thus generates a considerable velocity of exit from the holes *h*, which operates to cool the door, in the manner described.

I am aware that various constructions have been devised for cooling furnace-doors, and that it is not new to form a tortuous passage upon the inner side of a door, and to conduct air from holes in the door through such passage to the furnace; and I do not therefore claim, broadly, the combination of a furnace-door with ventillating means, but only the construction herein shown and described.

By my particular construction the casting and connection of the several parts are greatly facilitated, and by the curvature of the inner plate, *c*, the metallic surface exposed to the fire is in practice entirely prevented from bulging outward.

The door is provided with a tubular handle, *n*, which may be made of ordinary wrought-iron pipe, projecting ears *m* being formed upon the door to sustain the ends of the pipe in a vertical position, so that a draft of air may constantly rise through the same to keep it cool. This construction operates most effectively to keep the handle at a comparatively-low temperature.

By the use of the cooling device applied to the inner side of the door and the means for cooling the handle just described I am enabled to grasp the handle by the fingers without the use of a hook or poker, as is commonly required.

Having thus set forth my invention, what I claim herein is—

1. In a furnace-door, the combination, with the door-plate *a*, of the horizontal and vertical ribs *b*, formed integral therewith, the air-box having curved plate *c*, flanges *d* upon all its edges, and the vertical and horizontal ledges *e*, and the partition *f*, clamped between the ribs *b* and ledges *e*, and extending from the bottom of the air-box nearly to the top, and the door being provided with the holes *g*, near the horizontal rib *b*, and the plate *c* being provided near its bottom with the holes *h*, all arranged and operated as and for the purpose set forth.

2. In a furnace-door, the combination, with the door-plate *a*, of the horizontal and vertical ribs *b*, formed integral therewith, the air-box having curved plate *c*, flanges *d* upon all its edges, and the vertical and horizontal ledges *e*, and the partition *f*, clamped between the ribs *b* and ledges *e*, and extending from the bottom of the air-box nearly to the top, and the door being provided with the holes *g* near the horizontal rib *b*, and the plate *c* being provided near its bottom with holes *h*, greater in number and less in area than the holes *g*, as and for the purpose set forth.

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

WILLIAM KEARNEY.

Witnesses:
L. LEE,
HENRY J. MILLER.