

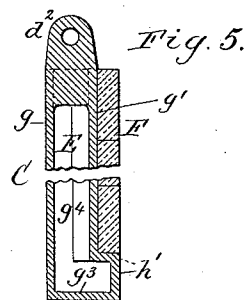
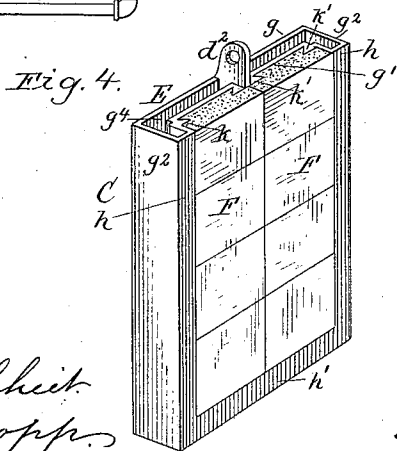
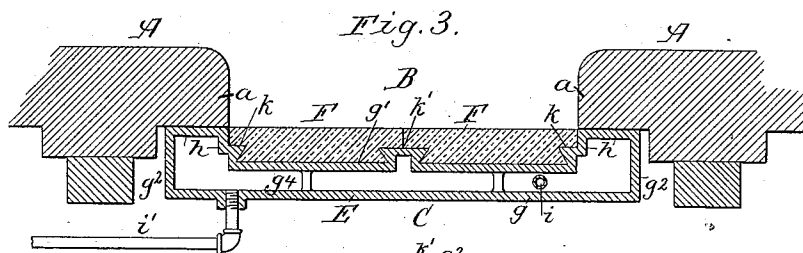
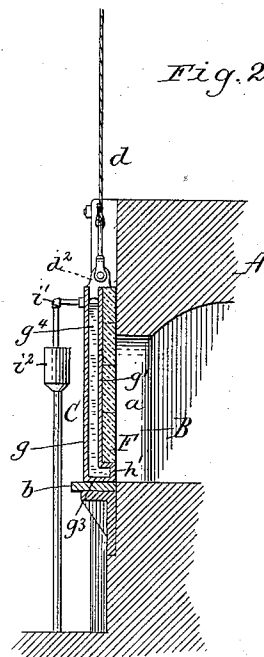
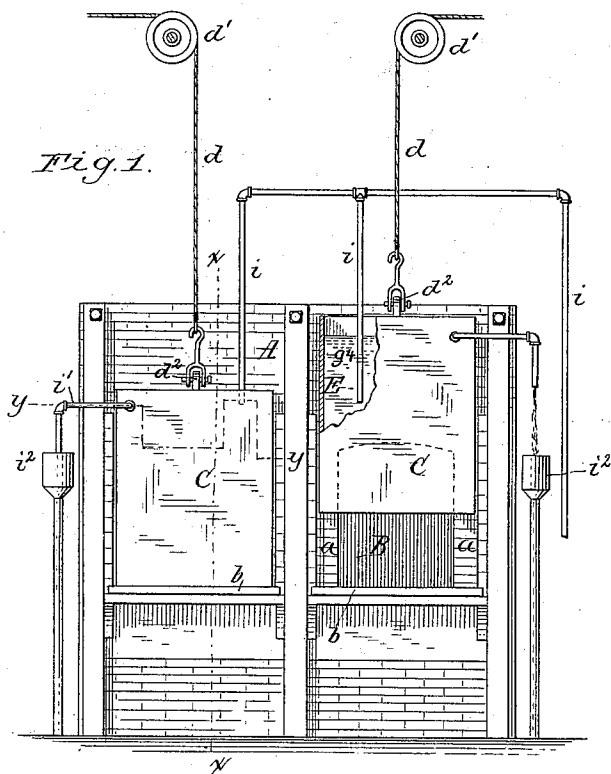
(No Model.)

L. E. JORDAN.

FURNACE DOOR.

No. 387,419.

Patented Aug. 7, 1888.



Witnesses.

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# UNITED STATES PATENT OFFICE.

LLEWELLYN E. JORDAN, OF BUFFALO, NEW YORK.

## FURNACE-DOOR.

SPECIFICATION forming part of Letters Patent No. 387,419, dated August 7, 1888.

Application filed November 3, 1887. Serial No. 254,147. (No model.)

*To all whom it may concern:*

Be it known that I, LLEWELLYN E. JORDAN, a citizen of the United States, residing at the city of Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Furnace-Doors, of which the following is a specification.

This invention relates to that class of furnace-doors which are made hollow and form a water-space through which water is circulated for keeping the door cool, and which are provided with a lining of fire-brick or other refractory material.

The object of my invention is to construct the door in such manner that the edges of the refractory lining as well as the adjacent portions of the furnace will be protected from excessive heat and prevented from warping or other injury.

The invention consists of the improvements which will be hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is an elevation of a furnace provided with my improved door, part of one of the doors being broken away to show its interior arrangement. Fig. 2 is a cross-section in line *x x*, Fig. 1. Fig. 3 is a horizontal section in line *y y*, Fig. 1, on an enlarged scale. Fig. 4 is a perspective view of the door. Fig. 5 is a central vertical cross-section of the same.

Like letters of reference refer to like parts in the several figures.

A represents the furnace, B the opening, *a* the jambs, and *b* the fore-plate thereof, all of which parts are of ordinary and well-known construction.

C represents the door arranged against the jambs *a* in front of the opening, and resting when closed with its lower edge upon the fore-plate *b* of the furnace. The door C is raised and lowered by means of a cable, *d*, which passes over a pulley, *d'*, and is connected at its lower end to a lug or ear, *d''*, formed centrally on the upper end of the door C.

The door C is composed of a hollow cast-iron frame, E, which is provided on its inner face with a lining, F, of fire-brick or other refractory material. The frame E consists of an outer wall, *g*, an inner wall, *g'*, end walls, *g''*, and a bottom wall, *g'''*, connecting the inner and outer

walls and forming a hollow water-space, *g<sup>4</sup>*, between the inner and outer walls.

*h* represents hollow vertical flanges projecting inwardly from the two end walls and the inner wall, and *h'* a similar flange projecting inwardly from the bottom wall and connecting the two vertical flanges *h* of the end walls. These hollow flanges *h h'* form enlarged water-spaces at the ends and bottom of the door and communicate with the hollow central water-space *g<sup>4</sup>*.

*i* represents the water-supply pipe, which is arranged above the door with its lower end depending into the space *g<sup>4</sup>* between the inner and outer walls, *g g'*, the top of the door being left open to permit the pipe to enter the space between the inner and outer walls, *g g'*.

*i'* represents the overflow-pipe, which is tapped into an opening formed in the outer wall, *g*, and extends laterally, with its discharge end arranged over a suitable receiver or funnel, *i''*. The hollow frame E is kept cool by the circulation of the water through the space *g<sup>4</sup>*.

The refractory lining F is secured to the inner wall, *g'*, between the vertical side flanges, *h*, and the bottom flange, *h'*, by dovetail ribs *k*, formed on the inner wall, *g'*, adjacent to the inner edges of the vertical side flanges, *h*, and a central vertical rib, *k'*, formed on the inner wall, *g'*, between the two vertical flanges *h* and similar dovetail grooves formed in the brick or lining F, as shown in Fig. 3. The lower edge or bottom of the fire-brick or lining F rests upon the bottom flange, *h'*, and the sides or ends of the brick or lining fit against the inner edge of the vertical flanges *h*, which are flush with the outer face of the lining. The lining is in this manner protected by the flanges *h h'*, and is prevented from coming in contact with the jambs *a* of the furnace and being injured thereby as the door is raised and lowered.

The vertical hollow flanges *h* protect the jambs *a* of the furnace from excessive heat and prevent them from burning out rapidly, and the bottom flange, *h'*, which rests upon the fore-plate *b* when the door is closed, serves to protect the fore-plate from warping and burning out. The flanges *h h'* form a complete protection to the edges of the fire-brick, and

by the constant circulation of the cold water in the hollow frame the lining of fire-brick is kept comparatively cool and prevented from crumbling. The flanges *h h'* also serve to strengthen the frame E. The frame E can be readily cast complete with the hollow flanges *h h'* and ribs *k k'*, and, with the lining F, forms a strong and durable furnace-door.

I claim as my invention—

10 1. In a furnace-door, the combination, with the hollow frame E, having an open top and a closed bottom and forming a water-space, *g'*, of hollow vertical end flanges, *h*, and a bottom flange, *h'*, projecting inwardly from the ends and bottom of the frame E and forming  
15 enlarged water-spaces at the ends and bottom of the central water-space, *g'*, a lining of fire-brick secured to the inner wall of the frame E between the end flanges, *h*, and bottom  
20 flange, *h'*, and a water-pipe, *i*, entering the water-space *g'* through the open top of the frame E, substantially as set forth.

2. In a furnace-door, the combination, with

the hollow frame E, having an open top and closed bottom and forming a hollow water- 25 space, *g'*, of hollow vertical end flanges, *h*, and a hollow bottom flange, *h'*, projecting inwardly from the ends and bottom of the frame E and forming enlarged water-spaces at the ends and bottom of the frame and continuations of the 30 central water-space, *g'*, vertical dovetail ribs *k k'*, projecting inwardly from the inner wall of the frame E between the vertical flanges *h*, and a lining of fire-brick, F, having dove- 35 tailed grooves and secured to the inner wall of the frame E between the ribs *k k'*, the edges and bottom of the lining being protected by the hollow flanges *h h'*, substantially as set forth.

Witness my hand this 28th day of October, 40 1887.

LLEWELLYN E. JORDAN.

Witnesses:

JNO. J. BONNER.

FRED. C. GEYER.