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L. L. KNOX.

FURNACE DOOR FRAME.

APPLICATION FILED AUG. 19, 1912.

1,070,487.

Patented Aug. 19, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

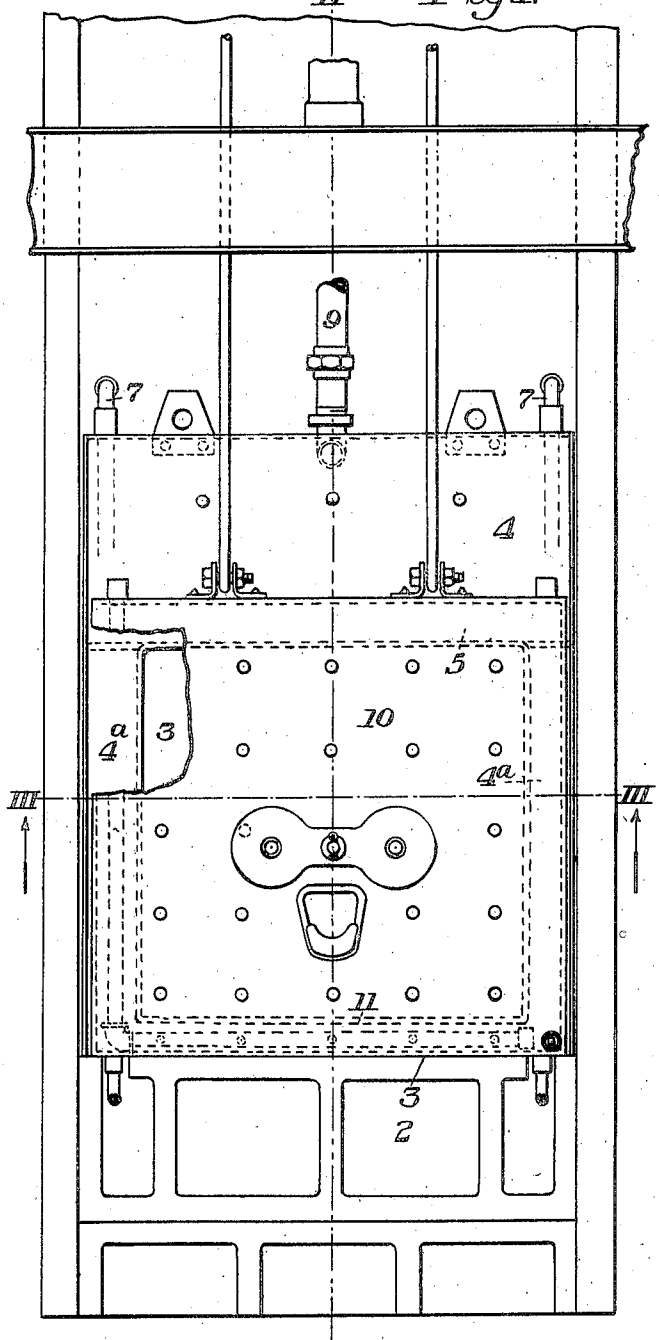
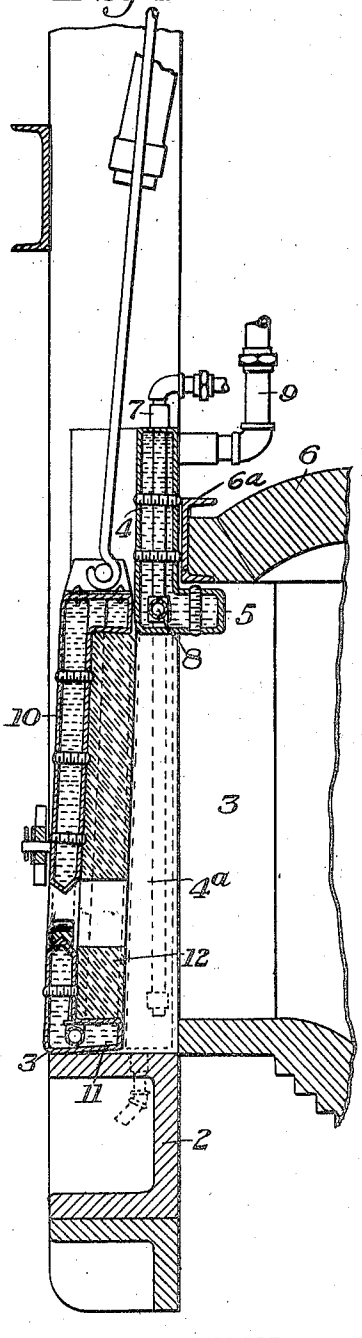


Fig. 2.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 3.

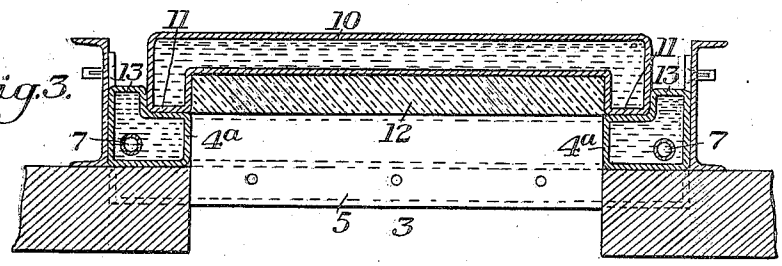


Fig. 5.

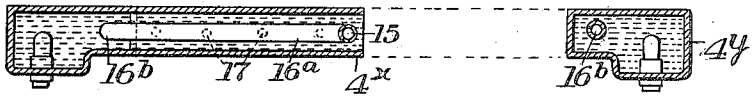
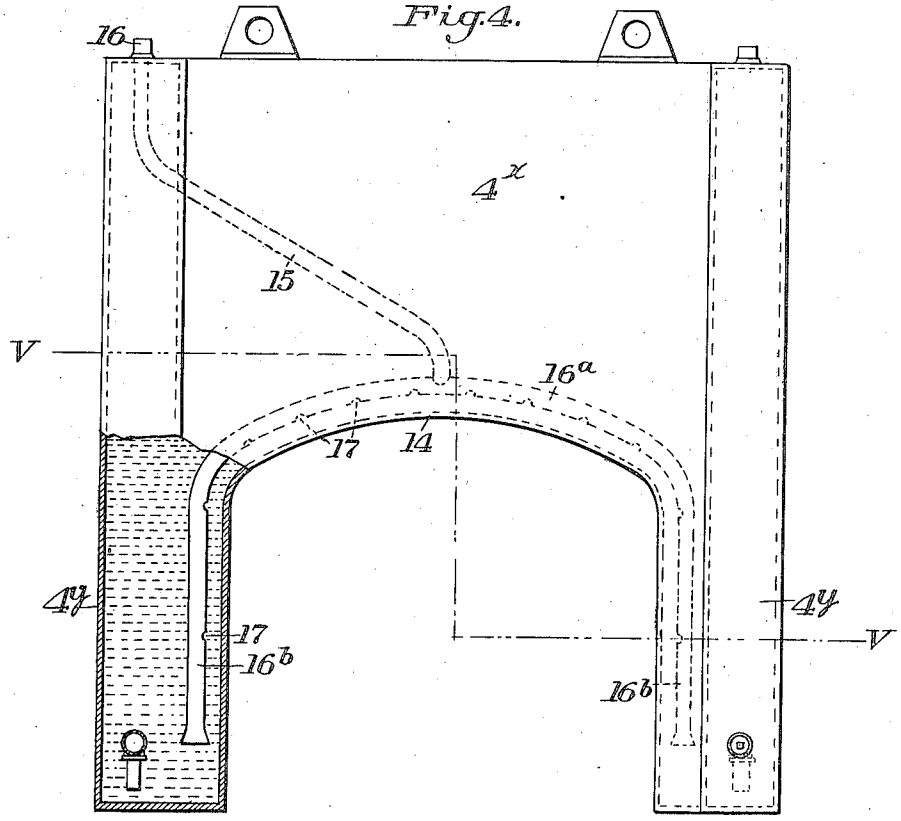


Fig. 4.



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UNITED STATES PATENT OFFICE.

LUTHER L. KNOX, OF NILES, OHIO, ASSIGNOR TO THE KNOX PRESSED & WELDED STEEL COMPANY, OF NILES, OHIO, A CORPORATION OF OHIO.

FURNACE-DOOR FRAME.

1,070,487. Specification of Letters Patent. Patented Aug. 19, 1913.

Application filed August 19, 1912. Serial No. 715,727.

To all whom it may concern:

Be it known that I, LUTHER L. KNOX, a resident of Niles, in the county of Trumbull and State of Ohio, have invented a new and useful Improvement in Furnace-Door Frames, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front elevation, partially broken away, of a door frame structure embodying my invention and showing a door applied thereto. Fig. 2 is a section on the line II—II of Fig. 1. Fig. 3 is a section on the line III—III of Fig. 2. Fig. 4 is a front elevation, partly broken away, of a slightly modified form of door frame, and Fig. 5 is a section on the irregular line V—V of Fig. 4.

My invention has relation to furnace door frames, and more particularly to water cooled frames designed for use with water cooled doors.

The invention provides a door frame which can be readily constructed; which will be durable; and which obviates the use of the top arch of refractory material heretofore commonly employed over the door opening.

The nature of my invention will be best understood by reference to the accompanying drawings in which I have shown the preferred embodiment thereof, and which will now be described, it being premised, however, that various changes may be made in the details of construction and arrangement of parts without departing from the spirit and scope of my invention, as defined in the appended claims. In these drawings, the numeral 2 designates the end wall of a furnace structure, having a door opening 3 which extends upwardly to the furnace.

4 designates my improved door frame, which preferably consists of sheet metal formed into a hollow structure consisting of an upper body portion above the door opening and a depending leg 4^a at each side of the opening. The upper body portion of the frame is formed at its lower edge with the inwardly offset hollow projecting portion 5, which extends underneath the roof wall 6 and directly below the channel-shaped metal-supporting member 6^a of the roof.

In the form shown, in Figs. 1, 2 and 3, water is supplied to the interior of the door frame by means of the two inlet connections 7 at the upper corners thereof and which extend downwardly within the respective legs 4^a. These two inlet pipes are connected by a transverse pipe 8 extending within the lower part of the body portion of the frame and having spray openings arranged to direct the cooling water downwardly against its exposed wall. 9 designates an outlet connection communicating with the upper central portion of the frame. 10 indicates a hollow water cooled door having inwardly projecting top, bottom and side portions 11, which support the refractory lining body 12, and which bear against the outer face of the door frame. To form guides for the door frame, it is constructed with a vertical offset 13 near each edge.

In the modification shown in Figs. 4 and 5, the construction is substantially the same as that first described, but the opening through the frame is shown as having an arched top wall 14; and instead of there being two separate inlet pipes, a single inlet pipe 15 is provided. This inlet pipe 15 has a supply connection at 16 and extends downwardly to the central portion of a distributing pipe 16^a which lies within the frame over the arched top wall 14 and has a leg 16^b depending into each leg of the frame. This distributing pipe is provided with a plurality of spray apertures 17 to direct the cooling water against the exposed walls of the frame. In these figures, 4^x designates the upper body portion of the door frame, and 4^y the depending leg portions thereof.

My invention provides a simply and durably constructed furnace door frame in which, owing to the inward projection above the door opening and whose exposed surface is constantly directly supplied with cooling water, I am enabled to dispense with the refractory top wall of the door opening which has heretofore been necessary. These refractory top walls are difficult to hold in place, particularly by reason of the extension and contraction to which they are subjected in use. They are furthermore liable to injury from contact with the furnace charging or poking apparatus. The inward projection 5 of the frame is made to protect the metal support for the roof wall 6.

It will be understood that the exact form and construction of my improved door

frame will vary according to the particular type of furnace to which it is employed; and that the water supply and circulating connections may also be changed within the scope of my invention.

I claim:

1. A furnace having a door opening therein, said opening extending upwardly to the end supporting metallic frame member for the roof wall of the furnace, and a water cooled door frame having an inwardly offset hollow projection extending into the said opening and directly below the said member and roof wall, and forming a protecting means for said member and wall; substantially as described.

2. A furnace having a door opening extending upwardly to the roof wall of the furnace, a metallic supporting frame member for said wall, the lower side of said frame member being substantially in line with the top wall of the door opening, a hollow water-cooled door frame having an inwardly projecting portion extending into said opening directly below the roof wall and acting as a protector to the latter and to its supporting frame, and means for bringing a supply of cooling water into direct contact with the exposed wall of said door frame at the top of said opening; substantially as described.

3. A door frame for furnaces having a hollow upper body portion formed with a hollow inward projection at its lower edge, and having hollow depending legs, and a water discharge pipe having a branch within the body portion and a branch within each leg; substantially as described.

4. A door frame for furnaces having a hollow upper body portion formed with a hollow inward projection at its lower edge, and having hollow depending legs, said legs being of L-shape in cross section to form door guides, and a water-discharge pipe having a branch within the body portion and a branch within each leg; substantially as described.

5. A furnace having a door opening extending upwardly to the end supporting member for the roof wall of the furnace, and a water-cooled door frame for said opening, said frame having a water-cooled upper portion which extends upwardly adjacent the outer face of said end member, and also having an inwardly offset water-cooled portion extending within the said opening directly below the said member; substantially as described.

6. A furnace having a door opening extending upwardly to the base line of the roof arch, and a water-cooled door frame having an inwardly projecting portion which extends into the upper portion of said opening directly below the base of the roof arch, substantially as described.

7. A furnace door frame, comprising a hollow structure having a door opening therethrough with a leg at each side of said opening, of a water supply pipe extending downwardly into said structure, and having a spray member extending downwardly into each of said legs, substantially as described.

In testimony whereof, I have hereunto set my hand.

LUTHER L. KNOX.

Witnesses:
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R. A. BALDERSON.