S. NAISMITH.
FURNACE DOOR FRAME.
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1,142,773.
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2 SHEETS—SHEET 1.

Fig. 1.

Fig. 2.

Inventor:
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by Wallace R. Lane
Attys.

witnesses:
John G. Ender
A. Forte
To all whom it may concern:

Be it known that I, SAMUEL NAISMITH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Furnace-Door Frames, of which the following is a specification.

My invention relates to furnace door-frames and has for its object a frame of this class of durable and efficient construction.

A further object is to provide a frame so constructed as to dispense with any brick or arch work between the upper portion of the door-frame and skew-back.

A further object is to provide a device of this class so designed as to efficiently protect the buck-staves or frame-work around the door-opening and so constructed that the parts subject to the intense heat may be quickly removed and replaced.

A further object is to construct a device of this class of a plurality of parts so designed that anyone of said parts can be easily and quickly removed without affecting the others.

The above and other features of novelty, advantages and capabilities of my invention will become apparent from a detailed description of the drawings, in which—

Figure 1 is a vertical section showing one form of my improved door-frame applied to an open hearth furnace. Fig. 2 is a front elevation of the same partly in section. Fig. 3 is a longitudinal section of the door-frame, and Fig. 4 is a front elevation showing a modified form of my invention.

Referring to the drawings in detail, I have used the reference numeral 10 to designate the arch roof of a furnace of the ordinary construction, 11 the skew-back, 12 the door-opening and 13 the bottom of the furnace.

The furnace is of the usual construction provided with buck-staves extending upwardly at the sides of the furnace, two of which staves are shown in the drawings as extending upwardly past the door opening adjacent thereto and are designated with the reference numeral 14. Extending the full length of the furnace across the door opening or openings, if there be more than one, there is a channel 15 which is secured by any suitable means to the buck-staves 14, as best shown in Fig. 1. This channel 15 supports the skew-back 11 by means of which the roof 10 is held in place.

Mounted within the opening 12 is a rectangular shaped water cooling frame and in the preferred form shown in Figs. 1, 2 and 3, consisting of an upper portion extending across the opening and forming a lintel 16, (the upper surface of which is adjacent to the skew-back 11) and two legs 19 adjacent to the sides of the door opening. The upper surface of the lintel 16 is placed adjacent to and covers the lower surface of the skew-back 11 as best shown in Fig. 1, thus eliminating an arch or wall of brick between such lintel and the skew-back. By this construction the lintel 16 can be readily and quickly removed without damaging the furnace or without necessitating the removal of a wall and further it fully protects the skew-back and skew-back channel 15 from the intense heat within the furnace. The lintel 16 of this frame is provided with two upwardly extending parallel walls 17 and 17', the wall 17' being positioned adjacent to the channel 15. The wall 17 is provided at each end with a flange 18 which flanges are secured to the buck-staves 14 by any suitable means, such as the bolts shown for detachably securing said lintel in place. The legs 17 are positioned adjacent to the buck-staves and extend inwardly into the rabbeted side walls of the opening, as best shown in Fig. 3. These legs are also provided with a flange 18 which is secured to the buck-staves by any suitable means such as the bolts shown for securing said legs in place. By extending the legs into the wall of the opening, as shown in Fig. 3 the fire or heat within the furnace is prevented from escaping between such legs and wall, thus efficiently protecting the buck-staves. In the event one of these legs or the lintel of the frame should become burnt out or otherwise damaged, such part or parts can be easily and quickly removed by simply removing the bolts which connect that part with the buck-staves. Oftentimes it may be necessary to remove parts of this door-frame while still heated to a very high degree. I have, therefore, provided the flanges on the legs 19 with hooks 20 formed integral therewith to which may be connected a crane or other suitable means for removing said legs. Rigidly secured to the upwardly extending walls of the lintel 16 on the inner side thereof are two partitions 21, as best shown in Figs. 2 and 4 for reinforcing said walls. Each of said partitions is provided with a suitable
opening through which opening connection is made to a crane or other means for removing said lintel.

In the form shown in Fig. 2 the water is supplied to the intake pipes 22 from the main pipe 23 and thence travels downwardly into the lower portion of the legs 19 and outwardly at the upper end through the outlet pipe 24 into the lintel 16 as indicated by the arrows. The lintel 16 may also be supplied direct from the supply pipe 23 through the pipe 25 by properly adjusting the water cock.

In the modified form shown in Fig. 4, the water cooling frame is all made in one piece and with this construction, the piping is somewhat simplified. While I have shown this water-cooled frame made in one and three pieces, it can be made in a plurality of parts to meet conditions at the various mills and can be made out of cast iron, cast steel, boiler plate, bronze, copper or any other suitable metal alloy. The frame is shown as open at the top, that is, the upwardly extending walls of the lintel 16 are not closed.

With this construction any steam that may be generated in the frame is allowed to escape and can be readily seen by the person in attendance on the furnace. However, it is to be understood that these walls may be closed at the top or made in any other suitable form and I do not therefore, wish to be understood as limiting myself to the particular forms shown.

It will be seen from the construction shown that in removing the lintel 16 there is no super-imposed wall structure to be provided for which greatly facilitates the removal and replacement of this part. It will also be seen that the flanges 18 on the respective parts of the door-frame serve to reinforce and strengthen the buck-staves when said parts are properly secured in place.

The skew-back or portion of a furnace extending across the door opening and supporting the roof shown in the drawings is formed separately from the roof, but this may be formed integrally therewith and when I have used the term "skew-back" in the specification and claims, I desire to be understood as including each of these forms.

While I have herein shown and described one embodiment of my invention, it is to be understood that various changes and modifications may be made by those skilled in the art, without departing from the spirit of my invention, as defined by the appended claims.

I claim:

1. The combination with a furnace provided with a door opening, the vertical walls of said opening being rabbeted at the outer corner portions thereof, of a water-cooled frame having hollow vertical members which engage the rabbeted portions of said walls, substantially as described.

2. The combination with a furnace provided with a door opening and with vertical frame members at each side of said opening, of a water-cooled frame having hollow leg and lintel portions surrounding three sides of said opening, and said portions having outwardly projecting flanges which are removably secured to said frame members, substantially as described.

3. A furnace door frame having a lintel portion open at its top and formed with interior partition walls, said walls having openings therein, substantially as described.

In witness whereof, I hereunto subscribe my name to this specification in the presence of two witnesses.

SAMUEL NAISMITH.

Witnesses:
A. L. Robb,
WM. MILLWARD.