C. E. BROWN.

DOOR ARCH FOR FURNACE DOORS.

APPLICATION FILED SEPT. 18, 1909.

947,033. Patented Jan. 18, 1910.

Fig. 1.

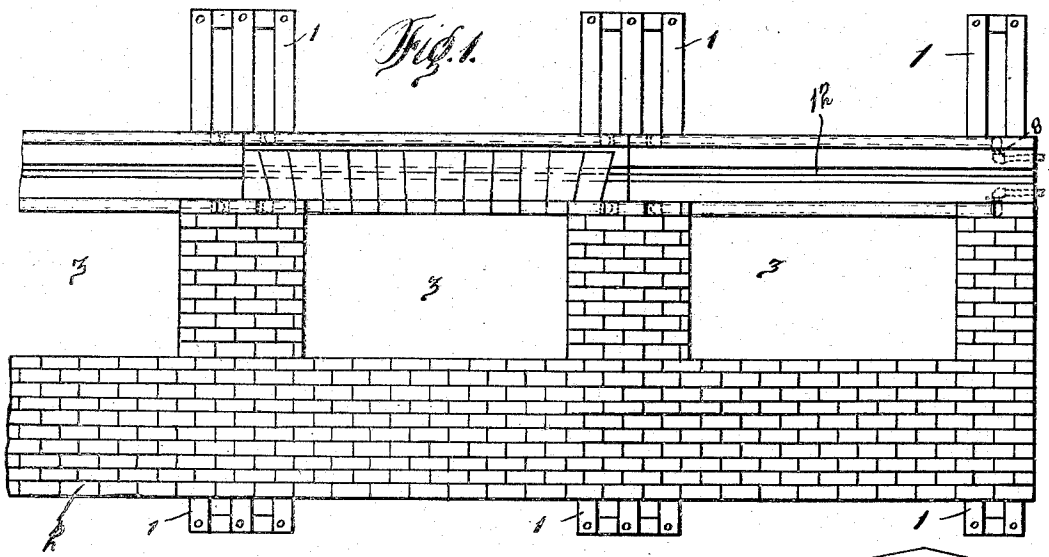
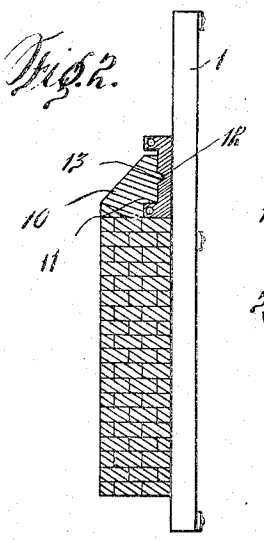


Fig. 2.



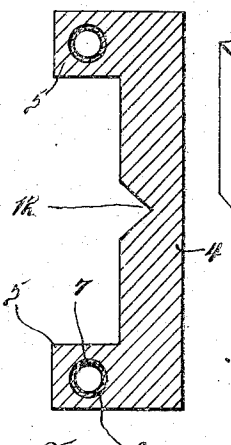


Fig. 3.

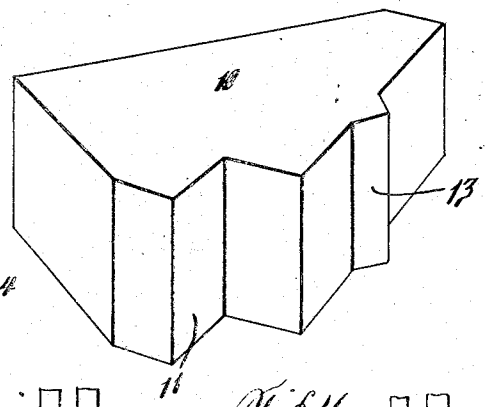


Fig. 4.

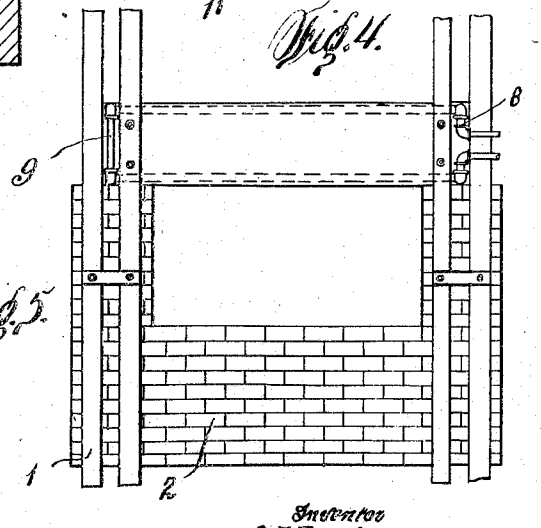


Fig. 5.

Witnesses
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UNITED STATES PATENT OFFICE.

CHARLES E. BROWN, OF NEW KENSINGTON, PENNSYLVANIA.

DOOR-ARCH FOR FURNACE-DOORS.

947,033. Specification of Letters Patent. Patented Jan. 18, 1910.

Application filed September 18, 1909. Serial No. 518,348.

To all whom it may concern:

Be it known that I, CHARLES E. BROWN, a citizen of the United States of America, residing at New Kensington, in the county of Westmoreland and State of Pennsylvania, have invented certain new and useful Improvements in Door-Arches for Furnace-Doors, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to door arch for furnace doors, and the primary object of my invention is to provide novel means for preventing the distortion, buckling, and disintegration of metal and masonry work forming the front of the furnace due to excessive heat within the furnace.

Another object of the invention is to provide a furnace with a water or air cooled arch or girder.

A further object of this invention is to provide a furnace-front with a girder designed for retaining the arching blocks or bricks in position whereby particles of the cracked or injured blocks or bricks cannot fall and injure persons in proximity to the furnace-front.

I attain the above objects by a door arch that has been particularly designed for steel mills having furnaces that are from time to time charged. In connection with this type of furnace a high degree of heat is maintained and that portion of the furnace bordering upon the doorway is subjected to considerable wear and tear, particularly when electrically operated charging machines are used.

The invention will be hereinafter considered in detail, specifically described and then claimed.

In connection with the drawing forming a part of this specification, there is illustrated a preferred embodiment of the invention, but it is to be understood that the structural elements thereof can be varied or changed without departing from the scope of the invention.

In the drawing:—Figure 1 is a rear elevation of a front wall of a furnace constructed in accordance with my invention. Fig. 2 is a vertical sectional view of the same. Fig. 3 is an enlarged cross sectional view of a metallic girder forming part of the furnace-front. Fig. 4 is an enlarged perspective view of one of the blocks or bricks forming part of the arch of the furnace, and Fig. 5 is a front elevation of a single furnace constructed in accordance with my invention.

In the drawings 1 denotes vertical frames, commonly called "buck-stays," and formed of vertical I-beams, channel-bars, and connecting braces.

2 denotes masonry work, preferably constructed of non-fusible bricks, this work being constructed against the frames 1 and arranged to provide doorways 3 between said frames.

4 denotes metallic girders arranged over the doorways 3, the girders being channel-shaped in cross section with the lateral flanges 5 thereof provided with longitudinal water or air conduits 6.

It is preferable in the manufacture of the girders 4 to make the same of cast iron, and when casting the same to embed wrought iron pipes 7 within the flanges 5 to serve as the water or air conduits.

The girders used in connection with a group or nest of furnaces are arranged with the ends thereof confronting one another, as best shown in Fig. 1 and the endmost girders are provided with suitable connections 8 and 9, the former receiving and discharging a supply of water or air, while the latter establishes communication between the upper and lower conduits of the girders to maintain a circulation of the cooling agent used in connection with the girders. It is preferable as best shown in Fig. 4 to extend the conduits of each girder in close proximity to the ends thereof and then use ordinary pipe fittings for connecting one girder to the other and establishing communication between the conduits of said girders. Connections 8 and 9 are preferably located upon the outer or front side of the girders, whereby the inner sides of the girders can be used for sustaining specially designed blocks or bricks 10 adapted to form the arches of the doorways 3. The blocks or bricks 10 are cut away, as at 11 to provide clearance for the lower flange of each girder, said blocks or bricks being sustained by the lower flanges in connection with the masonry work 2.

The girders 4 have the faces thereof provided with longitudinal V-shaped grooves 12, said grooves extending from one end of the girder to the other to accommodate V-shaped tongues 13 carried by the bricks or

blocks 10, these tongues corresponding in width to the bricks or blocks. The tongues 13 are adapted to assist in maintaining the bricks or blocks in position, and it is preferable to shape bricks or blocks in such a manner that one of said bricks or blocks will serve as a keystone in locking the other bricks or blocks between two supports.

It is possible to circulate water through the conduits of the girders and maintain the same in a cool condition while the bricks or blocks protect the girders from the heat within the furnace. In case air is used as a cooling agent, the connections 8 can extend into a suitable chimney or stack where a draft will cause a circulation of air through the conduits and connections of the girders.

Having now described my invention, what I claim as new is:—

In a door arch for furnace fronts, the combination with suitable supports forming a door-way, of a channel-shaped girder spanning said door-way and having conduits extending longitudinally of the flanges of the girder, fluid supply connections with said conduits, the said girder provided on its outer face at a point between the flanges with a longitudinally-extending groove, and non-fusible blocks fitted in said girder between the flanges thereof having tongues to engage said groove and being cut-away adjacent their lower faces to receive the lower flange of the girder.

In testimony whereof I affix my signature in the presence of two witnesses.

CHARLES E. BROWN.

Witnesses:
S. J. B. IRWIN,
E. J. BAXTER.