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H. A. POPPENHUSEN

FIRE ARCH

Filed Aug. 4, 1921

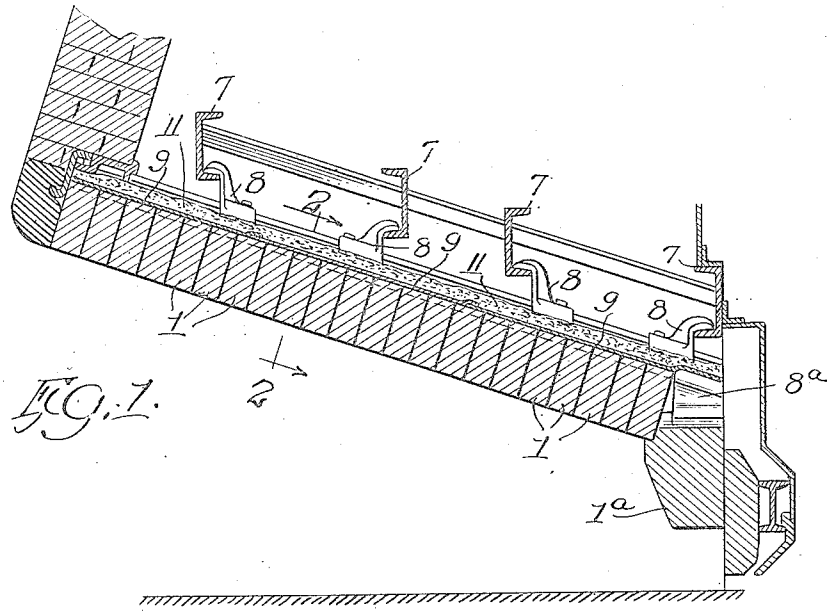


FIG. 1.

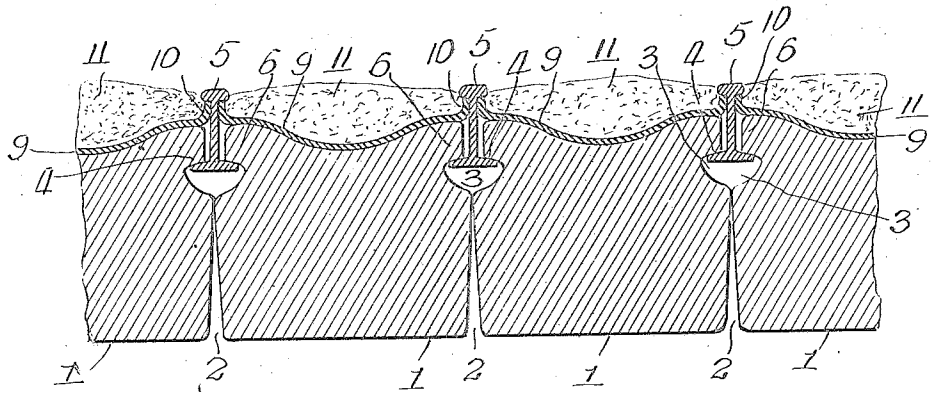


FIG. 2.

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UNITED STATES PATENT OFFICE.

HERMAN A. POPPENHUSEN, OF HAMMOND, INDIANA, ASSIGNOR TO GREEN ENGINEERING COMPANY, OF EAST CHICAGO, INDIANA, A CORPORATION OF ILLINOIS.

FIRE ARCH.

Application filed August 4, 1921. Serial No. 489,712.

To all whom it may concern:

Be it known that I, HERMAN A. POPPENHUSEN, a citizen of the United States, residing at Hammond, in the county of Lake and State of Indiana, have invented new and useful Improvements in Fire Arches, of which the following is a specification.

This invention relates to fire-arches for furnaces and more particularly to fire-arches made of rows of tiles suspended from a framework or upper structure.

The object of my invention is to provide means for closing or sealing the joints between the tiles and the spaces between the tiles and the supporting structure for preventing cold air being drawn into the combustion chamber down through the arch.

In the accompanying drawings—

Fig. 1 is a longitudinal vertical sectional view taken through a fire-arch provided with an air seal means in accordance with my invention; and

Fig. 2 is a fragmentary transverse sectional view taken on line 2—2 of Fig. 1.

The fire-arch shown in the drawings comprises a plurality of blocks or tiles 1, 1 arranged in rows extending at an inclination upward and inward from the front wall of the furnace setting, as usual in structures of this character. As illustrated in Fig. 1, the tiles 1 in each row rest one against the other and have contact throughout their engaging front and rear flat faces. In cross-section the tiles 1 are shaped substantially as shown in Fig. 2, there being spaces 2 between the several rows of tiles. These spaces 2 have the shape of inverted V's, the tiles in one row contacting sidewise with the tiles in the adjacent rows at the vertexes of said V's. Above these points of contact, the tiles have channels or grooves 3, 3 in their side faces to receive the base flanges 4 of the interposed I-beams 5 which project above the tops of the tiles, as shown. The shoulders 6 formed at the sides of the tiles along the tops of the channels rest on the base flanges 4 of the I-beams and cause the tiles to be suspended therefrom, as shown. The tiles made and mounted as shown are free to move relatively to each other about their points of contact as the temperature thereof varies while the furnace is in use.

The upper structure for the fire-arch, in addition to the I-beams 5, comprises a plurality of vertically arranged channel members 7, 7 located above the tiles and extending transversely across the arch between and supported by the side walls (not shown) of the furnace setting. The members 7 are spaced apart laterally, and engaging the base flanges thereof are hook-shaped members 8, 8, several for each I-beam. These depend from said channel members 8 and engage about the enlarged head portions of the I-beams 5 for suspending the same and the tiles in proper position.

To prevent cold air from being drawn down from above the arch into the combustion chamber therebelow through the spaces between the I-beams and the sides of the several tiles 1 and through the joints between the tiles in the several rows, I place on top of the tiles 1 of each row and between the I-beams 5 several sheets or layers 9, 9 of asbestos or other heat resistant flexible material. Each sheet 9 has a width to extend between the I-beams between which it is located with its side marginal portions 10, 10 against the adjacent sides of the I-beams 5, 5 above the tiles and engaging under the heads of said I-beams, as indicated in Fig. 2. This closes or seals the spaces between the I-beams and the tiles and also the joints between the tiles and prevents cold air above the arch from being drawn through the same into the combustion chamber therebelow by the suction on said combustion chamber.

To insure that the layers will be maintained in flat contact with the tiles 1 and the I-beams 5, 5, I place on said layers a packing of sand or other equivalent loose material 11. In each of the spaces between the I-beams 5, 5 there are a number of these flexible layers or sheets 9, and these overlap at their meeting edges, as shown in Fig. 1. The suction on the arch from below also aids in holding the sheets against the tiles and beams.

In the arch structure shown in Fig. 1, a tile or block 1^a at the end of each row adjacent the front wall of the furnace setting extends below the tiles in that row to provide a step in the under side or heat radiating surface of the arch to prevent cold air drawn into the combustion chamber through the inlet opening for the fuel following along and chilling that surface, as set forth in the pending application of Thomas A. Marsh, Serial No. 258,845, and filed October 19, 1918. The

titles 1ª are suspended in such positions from the I-beams 8 by adapter plates 8ª as in said application.

While I have shown and described herein in detail one form of means embodying the features of my invention, it is to be of course understood that the details of construction and arrangement of parts may be variously changed and modified without departing from the spirit and scope of my invention.

I claim as my invention:

1. A fire-arch, comprising an upper structure, a plurality of tiles suspended therefrom and in contact with each other, flexible sheets on said tiles and extending over the joints between the same for preventing the passage of air down through the arch between said tiles, and a packing of loose material on said sheets for holding the same against said tiles.

2. In a fire-arch, two laterally spaced beams, a row of tiles between said beams and suspended therefrom, said tiles being in contact with each other, and a flexible sheet on said tiles and extending over the joints between the same, said sheet having its side margins in contact with the portions of said beams projecting above said tiles for closing the space between said tiles and said beams.

3. In a fire-arch, two laterally spaced beams, a row of tiles between said beams and suspended therefrom, said tiles being in contact with each other, a flexible sheet on said tiles and extending over the joints between the same, the side margins of said sheet bearing against the side portions of said beams for closing the spaces between the same and said tiles, and a packing of loose material on said sheet between said beams for holding said sheet against said tiles and said beams.

4. In a fire-arch, two laterally spaced beams, a row of tiles between said beams and suspended therefrom, said tiles being in contact with each other, a plurality of flexible sheets on said row of tiles and overlapping at their meeting edges, said sheets extending over the joints between said tiles and having their side margins against said beams for closing the spaces between said tiles and said beams, and a packing of loose material on said sheets between said beams for holding said sheets overlapped and in contact with said tiles and beams.

5. A fire-arch, comprising a plurality of contacting tiles arranged in rows, beams between the rows of tiles and engaged therewith for suspending the same, said beams projecting above the tiles, and layers of sheet material over the tiles and between the beams, said layers covering the joints between the tiles and extending at their side edges to the beams and there engaging the same for closing the joints between the tiles and beams.

6. A fire-arch, comprising a plurality of contacting tiles arranged in rows, beams between the rows of tiles and engaged therewith for suspending the same, said beams projecting above said tiles, sheets of flexible material laid on the tiles between the beams for covering the joints between the tiles, said sheets extending to the associated beams and having their side margins overlapping the same, and loose material laid on the sheets to hold the same on the tiles and their side margins in contact with the beams, said loose material being held in place by the portions of the beams projecting above the tiles.

In testimony that I claim the foregoing as my invention, I affix my signature this 1st day of August, A. D. 1921.

HERMAN A. POPPENHUSEN.