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Patented Sept. 26, 1899.

G. R. JOHNSON.
COOLING DEVICE FOR FURNACE WALLS.

(Application filed Dec. 24, 1898.)

(No Model.)

Fig. 1.

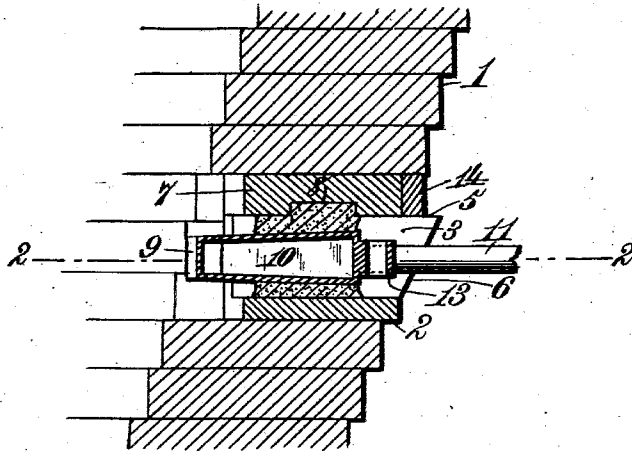


Fig. 2.

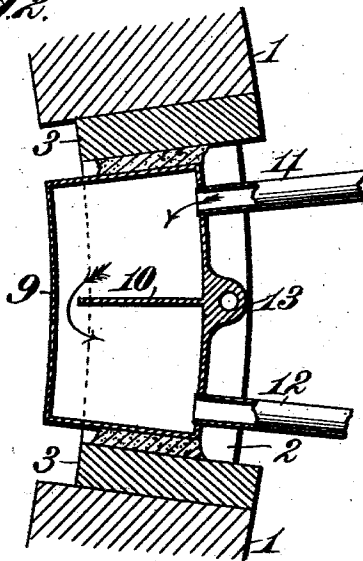
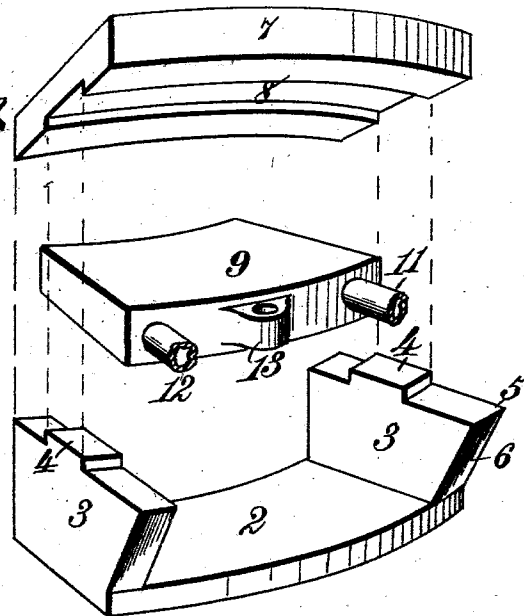


Fig. 3.



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UNITED STATES PATENT OFFICE.

GUY R. JOHNSON, OF EMBREVILLE, TENNESSEE.

COOLING DEVICE FOR FURNACE-WALLS.

SPECIFICATION forming part of Letters Patent No. 633,849, dated September 26, 1899.

Application filed December 24, 1898. Serial No. 700,223. (No model.)

To all whom it may concern:

Be it known that I, GUY R. JOHNSON, a citizen of the United States, residing at Embreville, in the county of Washington and State of Tennessee, have invented new and useful Improvements in Cooling Devices for Furnace-Walls, of which the following is a specification.

This invention relates to cooling devices for furnace-walls, and more especially to cooling-plates and their protective envelops or jackets designed for use in connection with the bosh-walls of blast-furnaces; and it has for its objects to render such devices more efficient and durable, to lessen their cost of manufacture and the labor and expense involved in their insertion in the furnace-walls, to facilitate the insertion and removal of the cooling-plates, and to increase the strength of such devices and more firmly unite them with the furnace-walls.

To these ends my invention consists in the features and in the construction, combination, and arrangement of parts hereinafter described, and particularly pointed out in the claims following the description; reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a sectional view of a portion of the bosh-wall of a blast-furnace and of the cooling-plate and jacket in place therein. Fig. 2 is a sectional view taken on the line 2 2 of Fig. 1; and Fig. 3 is a perspective view of the cooling-plate and jacket, showing the parts separated.

Referring to the drawings forming a part of this specification, the numeral 1 indicates the bosh-wall of a blast-furnace, constructed of refractory bricks in the usual manner. During the course of the construction of the furnace when the bosh-wall 1 has been built up to the proper height my improved cooling devices are inserted therein, and which I will now describe.

The numeral 2 indicates the bottom of one of the protective jackets, consisting of a cast-iron plate segmental in shape and provided at its opposite ends with upright sides 3, said sides lying in planes forming radii struck from the center of the furnace. Formed on the upper edge of each of the sides 3 is a rectangular lug 4, which projects a slight dis-

tance above the side 3, said lugs being formed at corresponding points between the ends of the sides. The outer upper edge of each of the sides 3 projects beyond the outer edge of the bottom 2, as at 5, and from its outer extremity is inclined downward to the outer edge of the bottom 2, as indicated at 6.

The numeral 7 indicates the segmental cast-iron top of the jacket, similar in size and shape to the bottom 2 and provided upon its under side with a groove 8. When the top 7 of the jacket is placed on the sides 3, the lugs 4 fit into the grooves 8 and effectually prevent any lateral movement of said top relatively to the sides.

It will of course be understood that a number of the jackets will be provided for each furnace and that they will be arranged in one or more series in the bosh-wall.

The bosh-wall having been built up to the requisite height, as before described, the bottoms of the jackets are then laid thereon in proper order and the tops fitted thereon, after which the brickwork is continued. In placing the jackets in position their inner edges should be arranged slightly beyond (in an outward direction) the inner surface of the bosh-wall. After all the jackets have been placed in position and bonded in the bosh-wall the cooling-plates are inserted. These plates consist each of a hollow bronze box 9, segmental in shape and rectangular in cross-section, the sides of each of the plates being parallel to the sides 3 of the bottoms 2 of the jackets and the outside dimension of each of said plates being slightly less than the inside dimensions of its jacket. A transverse partition 10 extends from the outer wall of each of the cooling-plates to a point near the inner edge thereof, and fitted in the outer wall of each of the cooling-plates and near the opposite ends thereof are two water-pipes, one of them, as 11, being an inlet-pipe and the other, 12, being an outlet-pipe. Formed on the outer wall of the cooling-plate is a perforated lug or ear 13, in which a suitable implement may be inserted to draw out the cooling-plate from its jacket. One such cooling-plate is inserted in each of the jackets, its inner end projecting beyond the inner end of the jacket and substantially in alinement with the inner surface of the bosh-wall. Stiff clay is then

packed in the spaces between the outer surfaces of the cooling-plates and the inner surfaces of the jackets. Finally a retaining-band 14 is placed about the bosh-wall and jackets and rests upon the outward extensions 5 of the latter. The retaining-band is tightly bonded about the bosh-wall to hold the jackets firmly in place.

The water-pipes are connected to any suitable water-supply to maintain a constant circulation of water through the cooling-plates to prevent the destructive effect of the excessive and continued heat from destroying or injuriously affecting the bosh-wall. By making the cooling-plates of bronze, copper, or similar material said plates are not so quickly deteriorated by the heat and their tendency to stick to the molten mass under treatment is avoided. The jackets being subjected to a less degree of heat are, for the sake of cheapness, made of cast-iron or the like. When from long-continued use the cooling-plates become unserviceable, they may be quickly removed by placing a suitable implement in the perforated ears and pulling them bodily from the jackets, after which new plates may be readily and quickly inserted and packed in place.

Having thus described my invention, what I claim is—

1. In a cooling device for the bosh-walls of furnaces, the combination with a protective jacket comprising a segmental bottom provided at its opposite ends with upright sides having upwardly-projecting lugs formed on their upper edges, a segmental top grooved upon its lower side to fit said lugs and fitted upon the upper edges of said sides, and a cooling-plate removably fitted in said jacket and provided with means for maintaining a

circulation of a cooling medium therein, substantially as described.

2. In a cooling device for the bosh-walls of furnaces, the combination with a protective jacket comprising a segmental bottom provided at its opposite ends with upright sides having upwardly-projecting lugs formed on their upper edges and outwardly-projecting extensions formed on their upper outer edges for supporting a retaining-band, a segmental top grooved on its under side and fitted upon the upper edges of said sides, and a retaining-band supported on the extensions of the said sides, of a cooling-plate removably fitted in said jacket and provided with means for maintaining a circulation of a cooling medium therein, substantially as described.

3. In a cooling device for the bosh-walls of furnaces, the combination with a protective jacket comprising a segmental bottom provided at its opposite ends with upright sides having upwardly-projecting lugs formed on their upper edges, and a segmental top grooved upon its lower side to fit said lugs and fitted upon the upper edges of said sides, of a cooling-plate comprising a hollow box similar in shape to but smaller in cross-section than the jacket, said cooling-plate being arranged concentrically within the jacket and packed therein with clay, and water inlet and outlet pipes fitted in the opposite ends of the cooling-plate, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GUY R. JOHNSON.

Witnesses:

M. H. MAURY,
ADA MARTINDILL.