(No Model.)

J. H. CREMER.

TUYERE FOR BLAST FURNACES.

No. 278,685. Patented June 5, 1883.

Fig 1

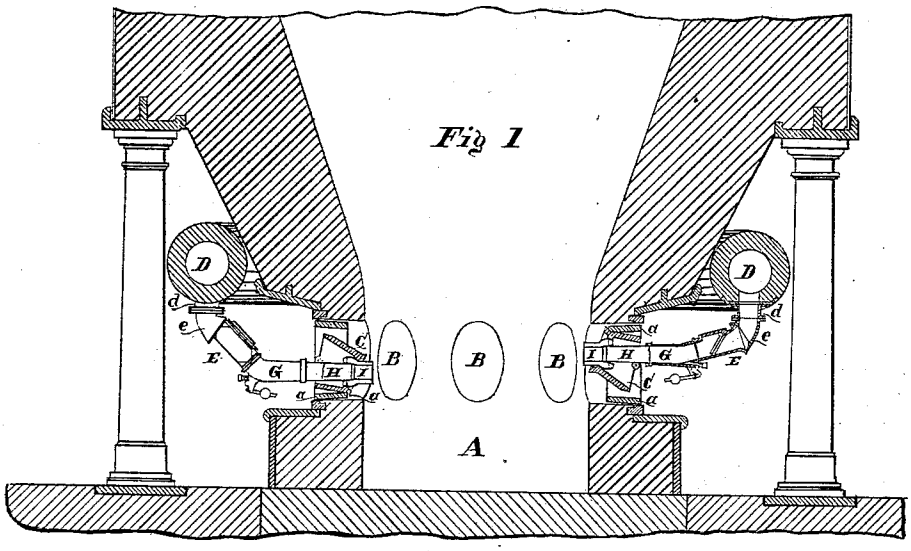
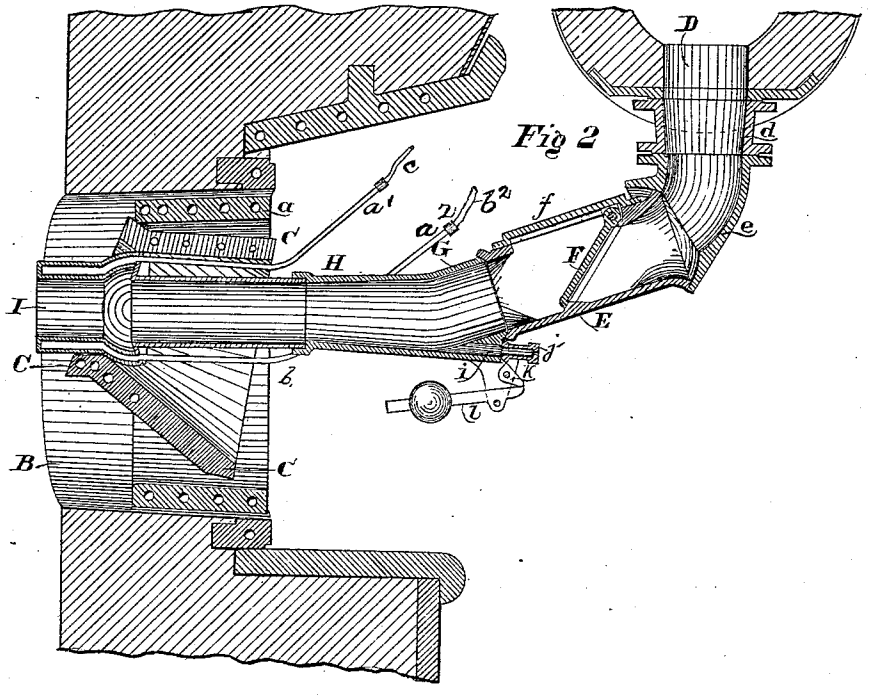


Fig 2



WITNESSES.

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TUYERE FOR BLAST-FURNACES.

SPECIFICATION forming part of Letters Patent No. 278,685, dated June 5, 1883.

Application filed December 16, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. CREMER, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Tuyeres for Blast-Furnaces; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to the construction of tuyeres for blast-furnaces, and has for its object the raising and lowering of tuyeres for admission of blast into the furnace at different heights.

For the most practicable and economical operation of blast-furnaces it is frequently of great importance to be able to transmit the blast at different heights above the hearth, and without deviating the course of blast from its horizontal line. Heretofore separate openings for inserting a tuyere at certain different heights had to be arranged for. This, however, is useful in exceptional cases only, since the upper tuyere may be too high and the other too low, while the proper point for admission of blast was at an intermediate point.

It is the object of my invention to produce an arrangement of peculiarly-shaped orifices to the hearth, with water-blocks and tuyere, by which the blast can be admitted higher or lower through the same openings in the furnace, and yet the blast maintain the horizontal direction.

Therefore my invention consists of the devices and combinations of devices employed by me, as hereinafter described and specifically claimed.

In the accompanying drawings, Figure 1 represents a sectional elevation of the lower portion of the blast-furnace, showing two of my improved water-blocks and tuyeres when adjusted at different elevations; and Fig. 2, a detached sectional view of blocks and tuyere on a larger scale.

Like letters represent corresponding parts in both figures.

A denotes the hearth of a blast-furnace, and B the orifices through the walls of the hearth for the admission of blast through water-blocks and tuyere. These orifices B heretofore were small round openings of just sufficient size to admit water-block and tuyere. In my arrangement I make these orifices vertically oblong, of an elliptic or rectangular shape. Each orifice B is lined with a similarly-shaped water-block or cast-iron ring, *a*, each of which has pipes cast in it for circulation of water. C is another water-block or tuyere-holder, which is formed funnel-shaped, and is made in the usual manner by casting metal around a coiled gas-pipe. The outward or butt end is oval, of the same form as the water-block *a*, and the inward end is circular. This water-block C has two trunnions, *b*, which are journaled in suitable bearings in the outward end of water-block *a*, so as to permit of a swinging or oscillating movement of block C. This water-block has also pipes cast inside for circulation of water. The inward or circular end of block C has a socket-joint on its inside, in which is fitted the tuyere I. This tuyere I is spherical on its outward end and straight cylindrical on its inward end, as shown per drawings. The spherical part forms a ball-and-socket joint with the socket of water-block C. The tuyere I is of copper or bronze, with double jacket for the circulation of water.

In Fig. 2 the water-circulating pipes and those for supplying the tuyere with a stream of cold water and for discharging the heated water are clearly shown.

The circulation of water in the tuyere is obtained by two pipes, a' a^2, tapped into the rear or butt end of the tuyere, water being admitted through the lower pipe, a^2, by means of a hose, b^2, and the warmed or waste water discharged through the upper pipe, a', by means of a hose, *c*.

D is the circular blast-pipe or horseshoe-main around the furnace. From this main the blast is admitted in the furnace through blow-pipes *d e* E G H, constructed as follows: Under the horseshoe-main D are secured nozzles *d*, one for each blow-pipe, and to each of these nozzles is bolted a half-elbow pipe, *e*, with a spherical socket in its end.

E is a square pipe, having a spherical rim or flange on one end, which enters the socket of

pipe *e* and forms a ball-and-socket joint therewith, and the opposite end of pipe E again has a flange that forms a spherical socket. The pipe E contains a flap-valve, F, which is opened by the blast of air forced through the pipe, and will exclude the gases from entering the horse-shoe-main when the blast is off.

G is a pipe-section which is somewhat tapering, and is half-elbow shaped at its wider end, the edge of which enters the spherical end of pipe E and forms a ball-and-socket joint therewith. The opposite or small end of pipe G is connected with pipe H by a screw-thread. The other end of pipe H connects with tuyere I. As will be noticed, the vertical lowering or raising of tuyere I is very simple. All that is necessary is to swing the water-block C on its trunnions, to close the opening between water-blocks *a* and C with clay, and to straighten tuyere I by means of its ball-and-socket joints, the different sections of blow-pipe E G H accommodating themselves by the ball-and-socket joints to such vertical adjustment, which movement will raise or lower the inward circular end of block or tuyere-holder C.

This invention may be applied also to the cinder-notch, so as to enable its being raised or lowered by similarly-shaped water-block C and copper tuyere I, the same differing only in size.

What I claim is—

1. In the hearth A of a blast-furnace having vertically oblong or elliptical openings B, the water-block *a*, in combination with water-block C, pivotally suspended in water-block *a*, and adjustably-jointed with tuyere I, substantially as and for the purpose set forth.

2. In the hearth of a blast-furnace, the combination, with the walls of a blast-furnace having vertically-oblong orifice B and water-blocks *a*, of the funnel-shaped water-blocks or tuyere-holders C, having a circular mouth at inside end to form a joint with the tuyere I, and oval or vertically oblong on its flaring outward end, and supported in water-block *a* on trunnions *b*, all constructed and arranged substantially as and for the purpose described and shown.

3. The funnel-shaped water-block C, being oval or vertically oblong at its flaring outward end and circular at its inward contracted end for forming a ball-and-socket joint with the spherical end of the tuyere I, such block C being supported upon trunnions *b* in a vertically-oblong water-block, *a*, that is inserted in vertically-oblong orifices B in the hearth A of a blast-furnace, all constructed and arranged substantially as described and shown.

4. The tuyere I, straight and cylindrical at one end and of a globular or spherical shape at the other end, for forming with the end of the water-block C a ball-and-socket joint, as set forth.

5. The funnel-shaped water-block C, being vertically oblong at its flaring end and circular at its contracted end, and being supported on trunnions *b*, in a vertically-oblong water-block, *a*, that is inserted into a vertically-oblong orifice, B, of the hearth A of a blast-furnace, in combination with blast-main D and the blow-pipe composed of sections *e* E G H, the sections *e*, E, and G being connected by ball-and-socket joints, and the tuyere I, forming a ball-and-socket joint with water-block C, all constructed and arranged to operate substantially in the manner set forth.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

J. H. CREMER.

Witnesses:
F. W. KASEHAGEN,
ADOLPH LOTZ.