2 Sheets—Sheet 1.

D. N. JONES.

Blast-Furnace.

No. 205,274. Patented June 25, 1878.

Sheet No 1.

Fig. 1.

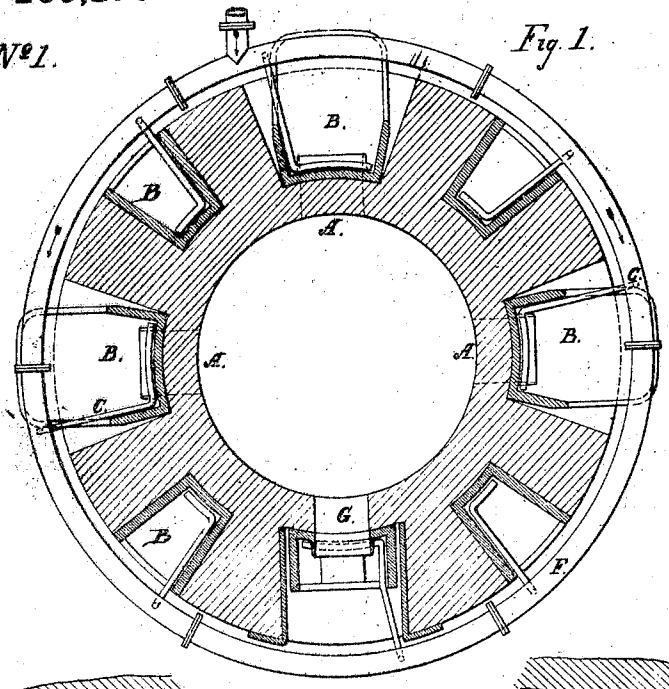
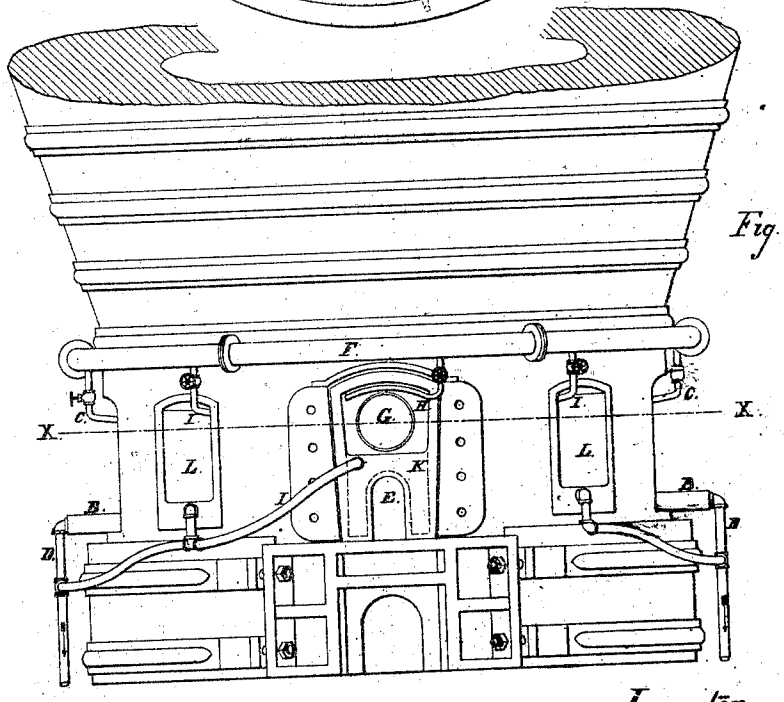


Fig. 2



Witnesses:
Lynn Elder
David Peelor

Inventor
Daniel N. Jones.

2 Sheets—Sheet 2.

D. N. JONES.

Blast-Furnace.

No. 205,274. Patented June 25, 1878.

Sheet No. 2.

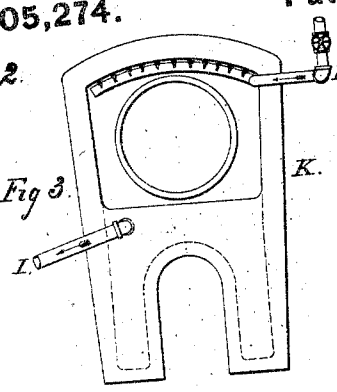


Fig. 3.

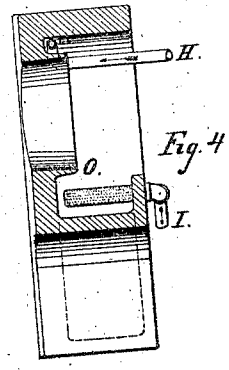


Fig. 4.

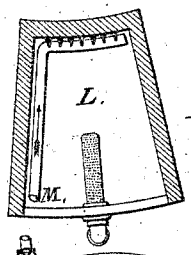


Fig. 5.

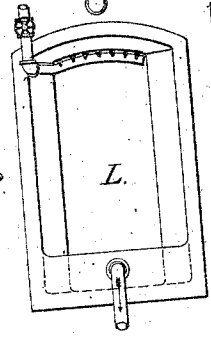


Fig. 6.

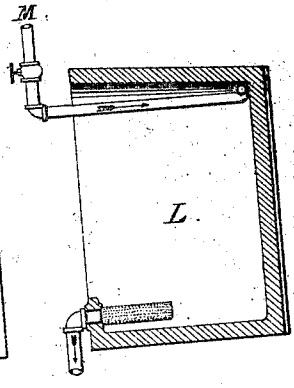


Fig. 7.

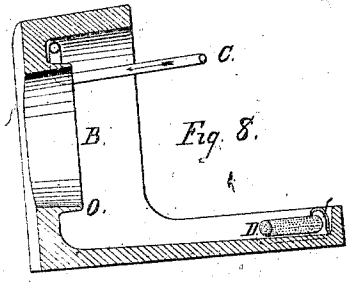


Fig. 8.

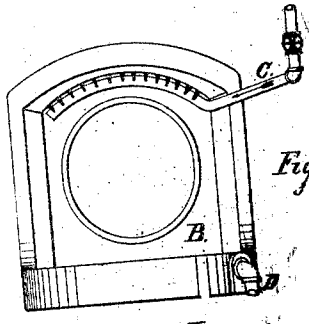


Fig. 9.

Witnesses:
Cyrus Eicher
David Peelor

Inventor:
Daniel N. Jones

UNITED STATES PATENT OFFICE.

DANIEL N. JONES, OF JOHNSTOWN, PENNSYLVANIA, ASSIGNOR OF ONE HALF HIS RIGHT TO CAMBRIA IRON COMPANY.

IMPROVEMENT IN BLAST-FURNACES.

Specification forming part of Letters Patent No. 205,274, dated June 25, 1878; application filed October 6, 1877.

To all whom it may concern:

Be it known that I, DANIEL N. JONES, of Johnstown, in the county of Cambria and State of Pennsylvania, have invented certain Improvements in Blast-Furnaces, of which the following is a specification:

The object of my invention is to protect the walls and lining of the lower part of blast furnaces (commonly called "hearth and bosshes") from injury by the direct action of the fire and extreme heat, which I effect by introducing into the brick-work of the furnace open iron boxes, which are cooled by sprays of water directed upon their inner surface, and thus cool the brick-work in contact with them.

In the accompanying drawings, Figure 1 represents a horizontal transverse section of the lower part of a blast-furnace, taken along the line X X, Fig. 2, showing my improvement. Fig. 2 represents a front elevation of the lower part of a blast-furnace provided with my improvement. Fig. 3 represents a front elevation of the cooling-box protecting that part of the furnace where the cinder is taken out and the tuyere-hole above the cinder-notch. Fig. 4 represents a sectional side elevation of the same. Fig. 5 represents a sectional plan of the cooling-box introduced between the tuyere-boxes. Fig. 6 represents a front elevation of the same. Fig. 7 represents a sectional side elevation of the same. Fig. 8 represents a sectional side elevation of the cooling-box used to protect that part of the furnace surrounding the tuyere-holes. Fig. 9 represents a front elevation of the same.

In the accompanying drawings, A A A represent the openings through which the tuyeres are introduced into the furnace. At that part of the furnace the cooling-boxes B B B, (shown in detail in Figs. 8 and 9, Sheet 2 (are introduced, and penetrate to within from four to twelve inches of the inside of the brick-work. The spray-pipes C C C, used for spraying water into and upon the sides of the cooling-boxes B B B, are furnished with water by the supply-pipe F, which runs around the furnace in the usual way, as represented in Fig. 2, Sheet 1. These spray-pipes C C C are perforated, so as to throw the water against the top and closed inner end of the cooling-boxes B B B, from which points it runs down, following the sides of the boxes, and collects in the bottom, from where it is drawn off by the waste-pipes D D D. Thus these boxes are kept perfectly cool, and being in contact with the brick-work at all points, except in their open front, they cool it, so as to preserve it from injury. The tuyere-opening G, lying directly over the cinder-notch E, is protected by a similar cooling-box, K, introduced into and penetrating the furnace, as above stated, and shown in detail in Figs. 3 and 4, Sheet 2; but the bottom of this cooling-box K is shaped, as shown in the accompanying drawing, Fig. 3, so as to form an archway over and around the space left for the passage of the cinder. The spray-water entering the pipe H collects over and around this archway, and is drawn off through the waste-pipe I. In this manner the brick-work is protected from any undue heat at this part of the furnace. To protect the brick-work between the boxes enveloping the tuyeres, I introduce into these spaces the blank boxes L L L, of similar depth, which are kept cool by means of spray-pipes, M M M, (shown in Figs. 6 and 7, Sheet 2,) the water being drawn off by means of waste-pipes N N N. In order to prevent the water following the front of the cooling-boxes B and K from entering the furnace through the tuyere-openings, the collars O (shown in the drawings, Figs. 4 and 8, Sheet 2) are raised at these points. The tuyere cooling-boxes B B B and the blank cooling-boxes L L L are constructed with a flange of from four to eight inches in height at the front and outward end to collect and hold the water, the depth of the water standing in the boxes being regulated by the position and size of the waste-pipes, the upper part of the outer end of these boxes being left open. The cooling-box K around the cinder-notch is closed in front to a point above where it is entered by the waste-pipe I, as shown in Fig. 3, Sheet 2. The number of blank cooling-boxes to be introduced into the body of the furnace will depend upon the size of the furnace and number of tuyere-openings, and I consider it desirable and safe to have a space between the different cooling-boxes on the

periphery of the furnace of twelve or more inches. By preference I make all of these cooling-boxes of cast-iron or brass.

I am aware that water has been introduced into castings by means of pipe-coils cast in them, and that such castings with coils of water-pipe have been used to cool certain parts of furnaces; and I do not claim this.

I claim as my invention—

A blast-furnace constructed with open spaces on its periphery, at the lower part thereof, and extending inward toward the lining of the same, said spaces being fitted with iron linings or boxes and provided with spray-pipes for cooling the furnace, as described.

DANIEL N. JONES.

Witnesses:
CYRUS ELDER,
DAVID PEELOR.