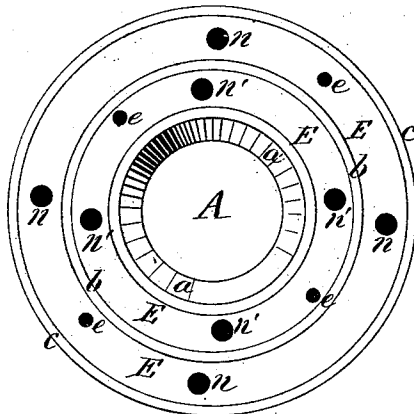
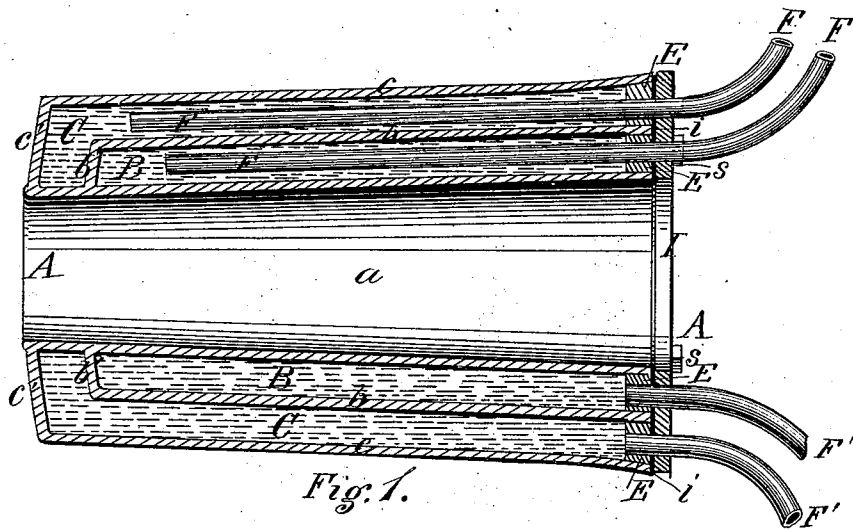


(No Model.)

N. A. DIDIER
TUYERE.

No. 254,433.

Patented Feb. 28, 1882.



Witnesses
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UNITED STATES PATENT OFFICE.

NICOLAS A. DIDIER, OF PITTSBURG, PENNSYLVANIA.

TUYERE.

SPECIFICATION forming part of Letters Patent No. 254,433, dated February 28, 1882.

Application filed December 27, 1881. (No model.)

To all whom it may concern:

Be it known that I, NICOLAS A. DIDIER, a citizen of the Republic of France, but having declared my intention of becoming a citizen of the United States, residing at Pittsburg, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Tuyeres; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a longitudinal sectional view of my improved furnace-tuyere, and Fig. 2 is a rear end view of the same.

My invention relates to that class of furnace-tuyeres which are covered exteriorly with a water-jacket as a protection against the destructive action of heat; and it consists in a tuyere or blast-pipe covered exteriorly with two water-jackets, one of which surrounds and extends over the front end of the other, each having a separate system of water supply and discharge, as hereinafter more fully described and claimed.

The class of tuyeres to which my invention relates have heretofore been surrounded by a single water-jacket, as protection against the heat of the blast acting on its inner wall and the heat of the furnace acting directly upon the outer wall. The supply of water, being thus exposed to heat both within and without, becomes heated to a high degree very quickly, and thus fails, in part, to afford the protection which would be secured with water at a lower temperature. Consequently the walls of the tuyere are quickly burned through and the tuyere unfitted for use. A more serious objection, however, with such tuyeres arises from the necessity practically of shutting off the blast through a tuyere as soon as the outer jacket is burned through, since it would be highly dangerous to allow water to escape into the furnace, and if the tuyere be used after the water-supply is shut off it is soon ruined. The purpose of my invention is to obviate these difficulties, and this I do by means of a tuyere, A, constructed as follows: An inner blast-pipe, *a*, of the usual size and length, is surrounded by an outer shell, *c*, of the same, or nearly the same, length, the two

being connected at the point or nozzle by a flange, *c'*, substantially in the manner commonly practiced. The space thus inclosed between the inner pipe, *a*, and outer shell, *c*, is divided by an inner shell, *b*, into two separate water-chambers, B and C, the inner shell, *b*, being connected to pipe *a* by flange *b'* in substantially the same manner as shell *c*, but a little distance back of the nozzle—say about equal to the radial distance between shells—whereby the outer chamber, C, surrounds and covers both the inner chamber, B, and the blast-pipe, and also extends over and covers the front end, *b'*, of the inner chamber. At the rear end these chambers B and C are closed by rings E E, secured in place between the pipe and shells by watertight connections, either in the course of manufacture, as in casting, or subsequently by brazing or otherwise. These rings are perforated with holes *n n'*, by preference four in each, for separate supply and discharge of water for each chamber.

In Fig. 1 I have shown a supply-pipe, F, and a discharge-pipe, F', for each chamber, the supply-pipes extending well in toward the nozzle of the tuyere to insure a full supply of water at that end. I prefer, however, to employ two supply and two discharge pipes for each chamber, as indicated by the holes *n n'*, Fig. 2, so that in case either a supply or discharge pipe for either chamber should become choked or disabled the free circulation of water through the tuyere will not be interrupted. These pipes may be secured in place in the usual or any convenient way, and the openings around them may be packed by a gasket, *i*, held against the base of the tuyere by a band, I, the latter being secured by bolts *s* through holes *e*. The supply of water through these pipes may be controlled by cocks or valves in the usual way; also, the usual means may be employed for supporting my improved tuyere in place in the furnace-wall.

It will be observed that the inner water-chamber, B, is protected in both its outer cylindrical surface and on its front end from the heat of the furnace by the outer chamber, C; also, that this outer chamber is protected over the greater part of its inner surface from the heat of the blast, and that one function of chamber

B is to cool the water in chamber C, the latter being exposed in use to the greater heat. The inner chamber thus serves a double purpose, and by means of the mutual protection of the two chambers the life of the tuyere is made much more than double the life of a tuyere having but a single water-chamber. Furthermore, it is often very disadvantageous to shut off the blast of a tuyere at a particular time. In my improved tuyere the water-supply for the outer chamber may be shut off in case the outer shell, *c c'*, should be burned through, and the inner chamber, B, be still supplied, thus permitting the successful use of the tuyere until such time as may be convenient for inserting an uninjured one, thus avoiding the danger or necessity of stopping the blast at a critical stage. This feature of my improvement I consider very important, as the life or simple cost of a tuyere is a small matter compared with the danger of removing and replacing tuyeres during the blast. Tuyeres embodying my invention may be

made of any of the materials usually employed for such purposes—such as phosphor-bronze, sheet or cast copper, cast or wrought iron, &c.— and they may be used in the usual way in blast or cupola furnaces, or in other furnaces in which tuyeres are usually employed.

I claim herein as my invention—

A furnace-tuyere, A, having its blast-passage surrounded by two separate water-chambers, B and C, the outer chamber, C, extending over both the side wall and front end of the inner chamber, with a separate water supply and discharge for each chamber, substantially as and for the purposes set forth.

In testimony whereof I have hereunto set my hand.

NICOLAS A. DIDIER.

Witnesses:

R. H. WHITTLESEY,
C. L. PARKER.