(No Model.)

F. G. NORDMANN.

WATER TUYERE.

No. 421,867. Patented Feb. 18, 1890.

Fig. 5.

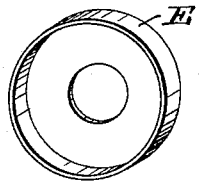


Fig. 6.

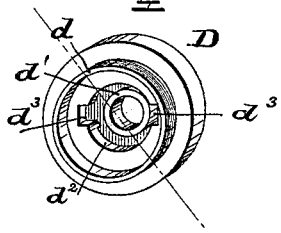


Fig. 1.

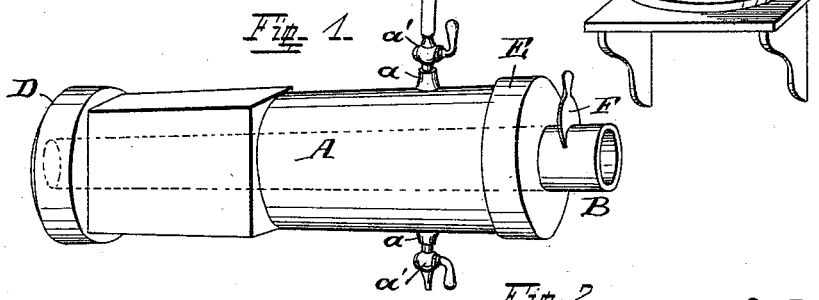


Fig. 2.

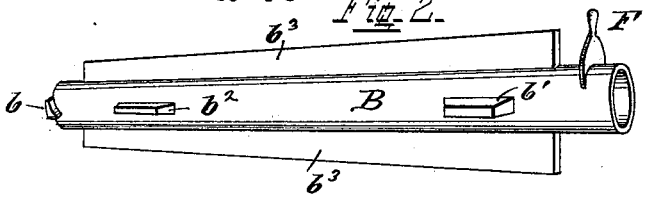


Fig. 3.

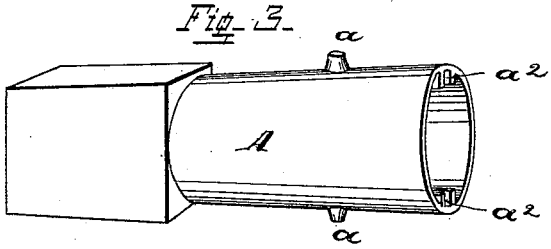
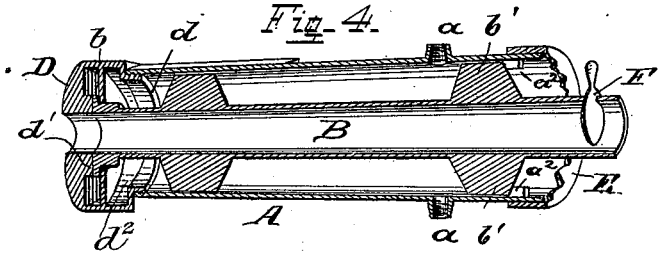


Fig. 4.



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UNITED STATES PATENT OFFICE.

FRIEDRICK G. NORDMANN, OF CINCINNATI, OHIO, ASSIGNOR OF ONE-HALF TO JOHN L. ROTH, OF SAME PLACE.

WATER-TUYERE.

SPECIFICATION forming part of Letters Patent No. 421,867, dated February 18, 1890.

Application filed June 24, 1889. Serial No. 315,363. (No model.)

To all whom it may concern:

Be it known that I, FRIEDRICK GOTTHELF NORDMANN, a citizen of the United States, residing at Cincinnati, in the county of Hamilton, State of Ohio, have invented certain Improvements in Water-Tuyeres, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The object of my invention is to so construct a tuyere for blast-furnaces and forges as that it will admit of the circulation of water therein to prolong its life, as will more fully hereinafter appear.

In the accompanying drawings, Figure 1 is a perspective view of my improved tuyere. Fig. 2 is a perspective view of the central air or blast tube. Fig. 3 is a perspective view of the outer shell with the blast-tube removed. Fig. 4 is a central longitudinal section through the tuyere, all the parts being in an operative position. Figs. 5 and 6 are perspective views of the rear and front caps, respectively, which engage the outer shell of the tuyere.

My improved water-tuyere is preferably constructed as follows: The outer casing or shell A has a central longitudinal opening tapering gradually from its rear to the front end, into which the central air-tube B is placed. This outer shell is preferably provided with two lugs a, cast thereon, through each of which is made a screw-threaded opening, into which the faucets a' are screwed, a suitable tube being connected to one of said faucets and leading to a suitable water-tank. The front inner face of this shell is preferably provided with a screw-thread, as shown in Fig. 4, to engage with the screw-thread on the circular flange d of cap D. The front cap D is formed hollow with an inner rearwardly-projecting boss d', through which is an opening for the escape of the forced air, said lug fitting up against the end of the air-tube, as shown in Fig. 4. This cap is also provided with an inner circular wall d^2, which is of a helical form on its outer face and has the openings d^3 therein to admit the wedge-shaped lugs b on the front end of the air-tube entering through said openings to engage the helical surface on the outer face of said wall.

Upon the rear inner end surface of the shell A are cast the guide-lugs a^2, between which the rear short ribs b' of the tube B fit, similar ribs b^2 being cast on said tube at its front portion to retain it in proper position in the outer shell. Two longitudinal ribs b^3 are cast upon the tube for its greater length, which fit snugly within the outer shell and serve to divide the current of water, and also to retain the air-tube in proper position in the outer shell.

A cap E is fitted tightly over the rear end of the outer shell in any suitable manner, the rear end of the air-tube projecting through an opening in said cap.

To facilitate in regulating or entirely cutting off the flow of air in the tube, I have provided the cut-off F, which may be connected and operated in any suitable manner.

When a small fire only is wanted, the faucets may be removed, which will permit of cool air circulating in the water-chamber; but for hot fires the water is preferred.

The operation of my device is as follows: The tuyere is inserted through the masonry or other material of the furnace, the front end projecting into said furnace the required distance. The rear end of the air-tube is connected to the bellows or other air-generator, which forces the air through said tube into the furnace to aid in the combustion of the fuel. The water is introduced into the tuyere between the outer casing and the air-tube by means of the faucet and tube leading to the water-tank. The lower faucet is opened sufficiently to permit the water to drain off slowly, which effects a circulation of the water in the front hollow cap, which is exposed to the greater heat, and thereby acts to preserve said cap from being burned out. If the front cap should from any cause have to be replaced, the same can be done at a small expense without having to remove the main body of the tuyere. Caps having differing sizes of openings may be employed, according to the size of furnace and amount of air required.

I am aware that it is not new, broadly, to provide a water-tuyere; but

What I claim as new, and desire to secure by Letters Patent, is—

1. A water-tuyere having an outer shell A and inner air-tube B, the latter having the lugs b at its front end portion, in combination with the rear and front caps E and D, the latter being formed hollow with an inner wall d^2, helically shaped on its outer face, with the recesses d^3 therein, said lugs b entering the openings d^3 and engaging said helical-shaped wall in cap D, and suitable means for introducing water into and from said tuyere, as set forth.

2. A tuyere having an outer shell A, central air-tube B, the latter having the wedge-shaped lugs b and ribs b' b^2 b^3, cast with said tube, and caps E and D, the latter having the helical-shaped wall d^2, with recesses d^3 therein, and suitable faucets connected to said outer shell for introducing water into and from the tuyere, as set forth.

F. G. NORDMANN.

Witnesses:
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JESSE R. LAW.