July 20, 1937. F. H. N. GERWIG 2,087,842

TUYÈRE DIAMETER REDUCER

Filed Oct. 31, 1936

Fig. 1.

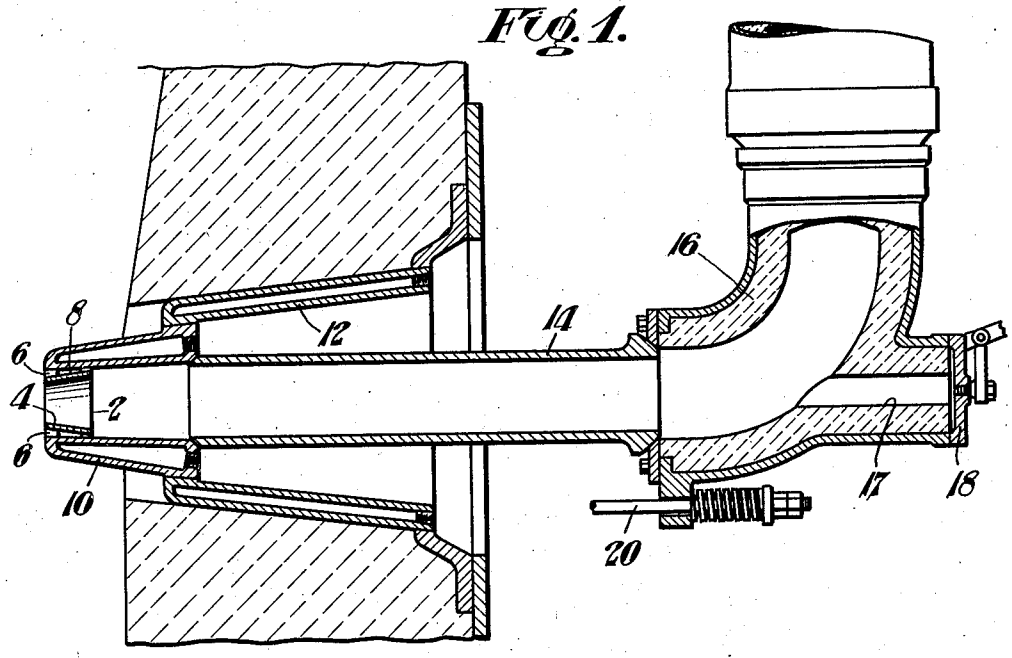


Fig. 2.

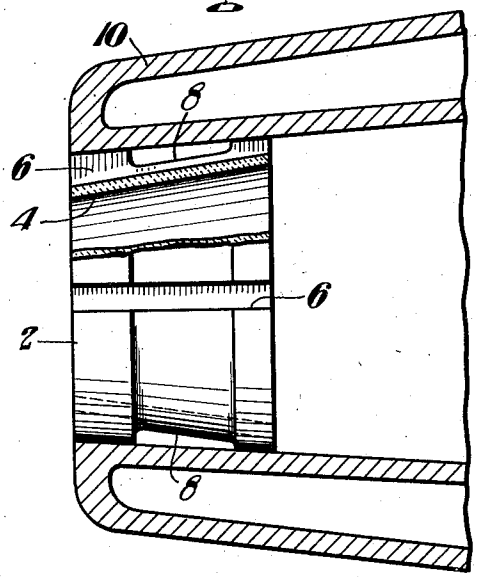
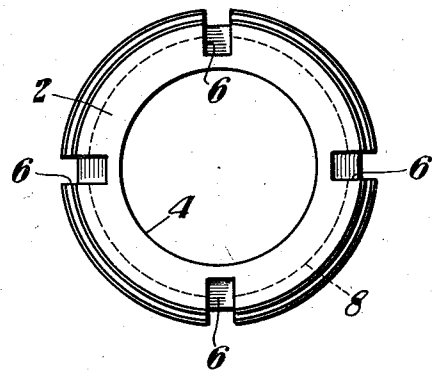


Fig. 3.



Inventor:

FREDERICK H. N. GERWIG,

by: Usina & Rauber

his Attorneys.

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TUYÈRE DIAMETER REDUCER

Frederick H. N. Gerwig, North Braddock, Pa.

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3 Claims. (Cl. 266—41)

This invention relates to means for controlling the air blast introduced into a blast furnace, and particularly relates to means for reducing the diameter of a tuyère nozzle.

In actual use the amount of iron desired to be produced from a blast furnace often varies widely. When the amount of iron produced by the blast furnace is reduced, then the air blast supplied to the furnace must be varied correspondingly if the furnace is to have a good yield and be kept in good condition.

The object of this invention is to provide an inexpensive, easily insertable bushing which is adapted to be fitted in the nozzle of a tuyère to reduce the effective diameter thereof, and consequently reduce the air blast entering the furnace through said tuyère.

Another object is to provide a reducing bushing designed and adapted to fit the interior end of the tuyère so as to maintain the necessary velocity of the blast required and to provide a sufficiently positive horizontal penetration of the blast to insure a "good working" furnace by preventing the blast from traveling vertically along the bosh wall.

The above and further objects wil be apparent from the enclosed drawing in which:

Figure 1 is a longitudinal sectional elevation of one embodiment of my invention in position in a blast furnace;

Figure 2 is an enlarged elevation, partly broken away, of the embodiment of my invention shown in Figure 1 mounted in a tuyère; and

Figure 3 is an end elevation of the embodiment of my invention shown in Figure 2.

Referring more particularly to the accompanying drawing, the numeral 2 indicates a bushing which is adapted to be placed in the nozzle of a tuyère. The bushing 2 is preferably in the form of a tapered cylinder having a bore 4 which is tapered in the same direction and at a greater angle than the outer surface of the bushing 2. The size of the bore 4 is determined by the volume and velocity of the blast required to blow the furnace. As the velocity of air forced through a tuyère is directly dependent on the diameter of its nozzle, the air blast velocity can easily be varied by inserting the bushing 2, which decreases the effective diameter of the tuyère, in the nozzle of the tuyère.

The invention contemplates constructing the bushing 2 in such a manner and from such material that the bushing 2 can be broken while in the tuyère when no longer required therein. Of course, the bushing 2 must be strong enough to stand the ordinary shocks and heat attendant its installation and use in the tuyère. As the bushing 2 is but a temporary diameter reducer for a tuyère, it should be easily removable from the tuyère when no longer required therein. With this purpose in view, the bushing 2 is made frangible by cutting a plurality of grooves therein which form weakened areas or zones in the walls of the bushing. A plurality of longitudinally directed grooves 6 and a circumferential groove 8 may be cut into the walls of the bushing 2 in order to form the desired weakened zones and facilitate breaking the bushing into pieces of disposable size.

In Figure 2 of the drawing, the bushing 2 is shown positioned in a tuyère 10. The tuyère 10 is of a standard design and mounted in the blast furnace by a tuyère cooler 12. A blow-pipe 14 bears on the rear of the tuyère 10 and connects to a penstock 16. The penstock 16 is provided with a peep-hole 17 and a peep-hole cover 18 which are aligned with the blow-pipe 14. The penstock 16 is made to bear upon the blow-pipe 14 by a hanger bolt 20 or other similar means. The blast of air required for the furnace is supplied by a bustle pipe (not shown) which is connected to the penstock 16. The air blast reaches the tuyère 10 and the bushing 2 through the blow-pipe 14.

The tuyère 10 is designed to furnish the volume and velocity of air blast required for the normal production of the furnace. However, when this production is decreased, the air blast must be decreased and this is readily done by inserting the bushing 2 in the tuyère 10, thereby reducing the blast while at the same time maintaining or if desired, increasing the velocity of the blast. In order to insert the bushing 2, the hanger bolt 20 must be loosened and the blow-pipe 14 removed. Then the bushing 2 can be inserted in the tuyère 10 and the blow-pipe 14 replaced, thus reducing the effective air passage through the tuyère and consequently increasing the velocity of the air blast as it enters the furnace.

The bushing 2 can be removed by a repetition of the steps required to insert it, or it can be broken while in the tuyère 10 if desired. A rod or other means can be inserted through the peep-hole 17 and, by one or two well placed blows, break the bushing 2. The fragments of the bushing 2 can then be pushed into the furnace and the full blast of the tuyère 10 restored.

It will be appreciated that the invention is not limited to the specific form illustrated and described, but is actually defined in the appended claims.

I claim:

1. A temporary diameter reducer for a tuyère comprising a hollow bushing of heat resisting material and adapted to fit in a tuyère, said bushing being provided with at least one longitudinally and at least one circumferentially extending groove in the outer surface thereof forming weakened zones for facilitating the breaking of said bushing.

2. A temporary diameter reducer for a tuyère comprising a bushing adapted to fit in a tuyère, said bushing being composed of frangible heat resisting material and provided with at least one groove in the outer surface thereof forming weakened zones for facilitating the breaking of said bushing.

3. A temporary diameter reducer for a tuyère comprising a bushing composed of frangible heat-resisting material and provided with a wall having indentations therein forming weakened zones for facilitating the breaking of said bushing.

FREDERICK H. N. GERWIG.