Sept. 4, 1928.

1,682,816

G. W. VREELAND

TUYÈRE

Filed July 8, 1927

Fig. 1.

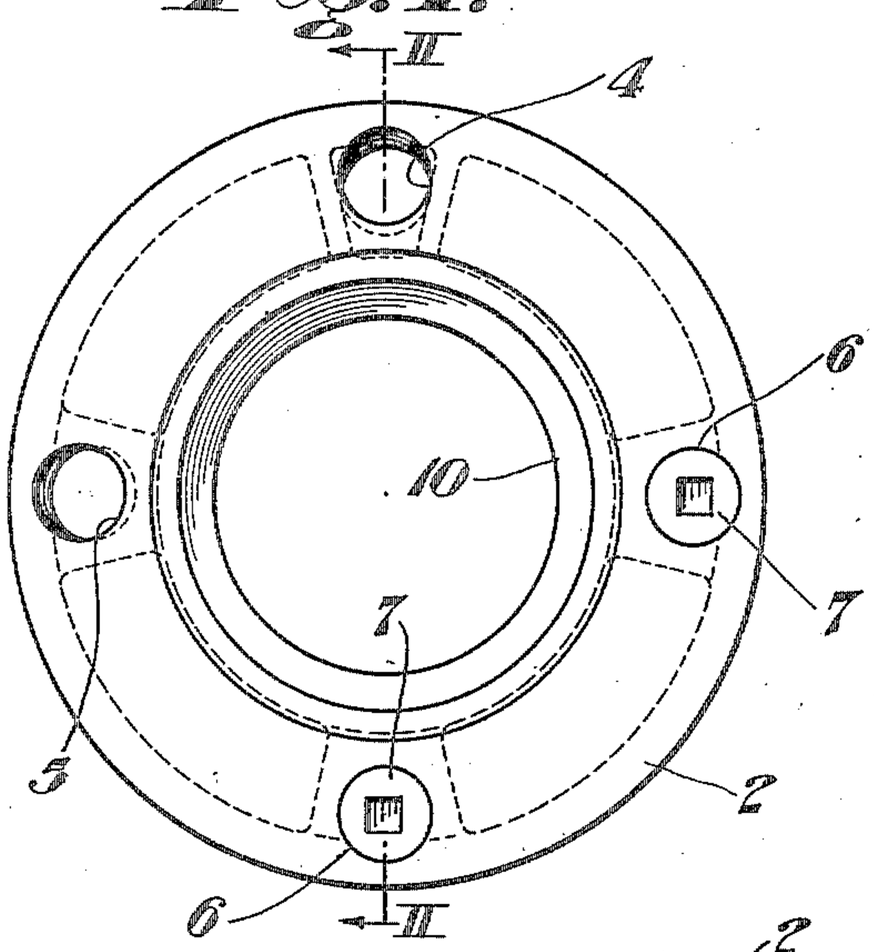


Fig. 4.

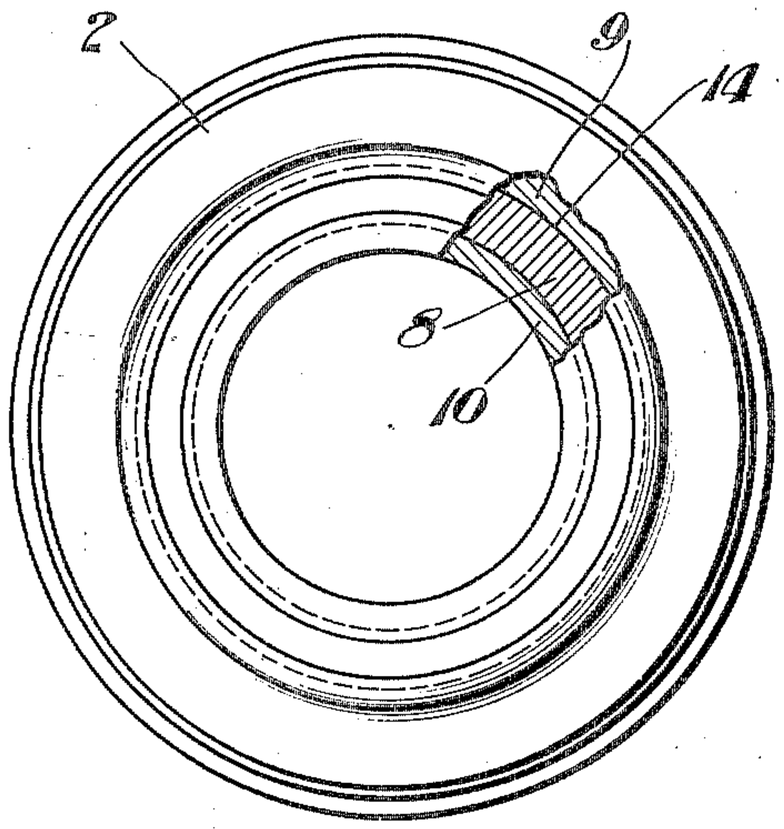


Fig. 2.

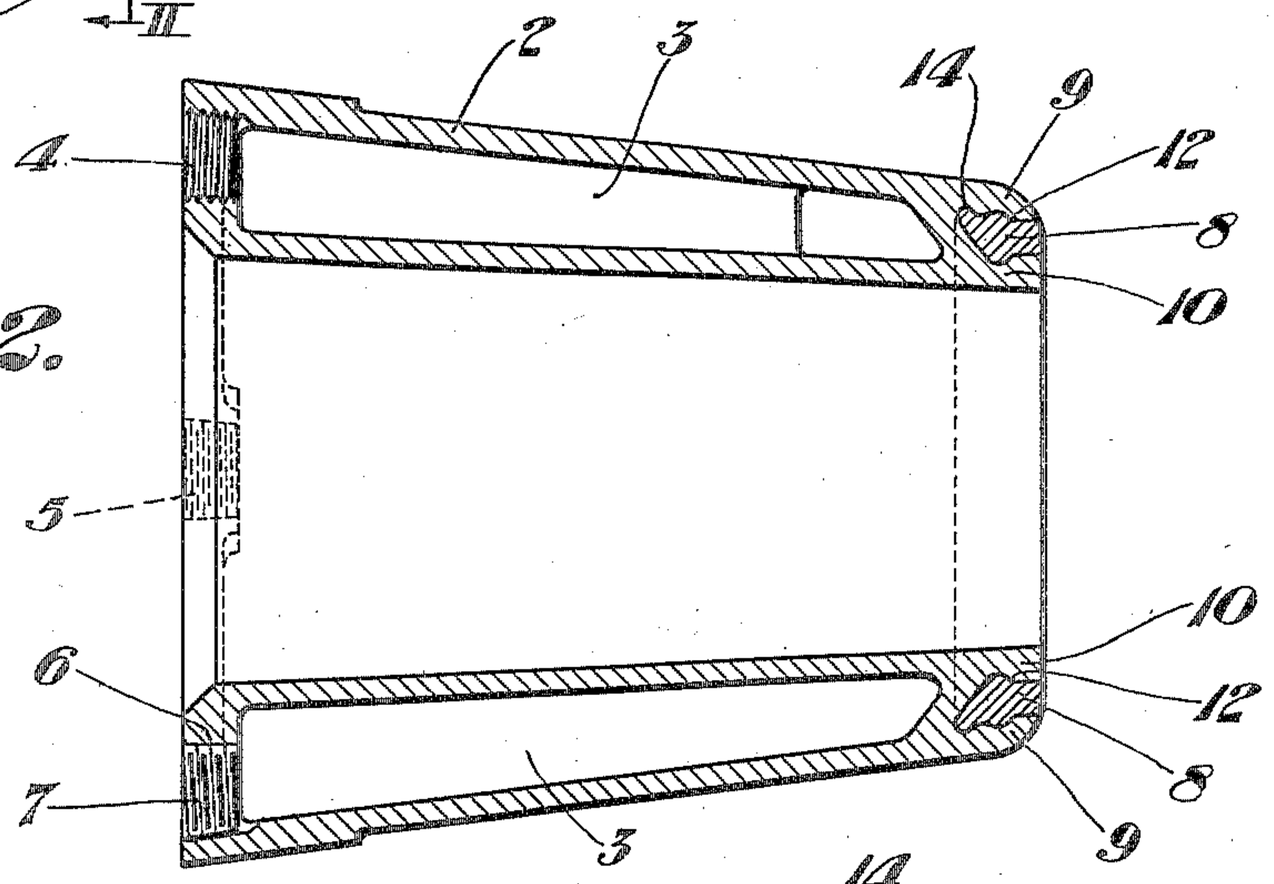
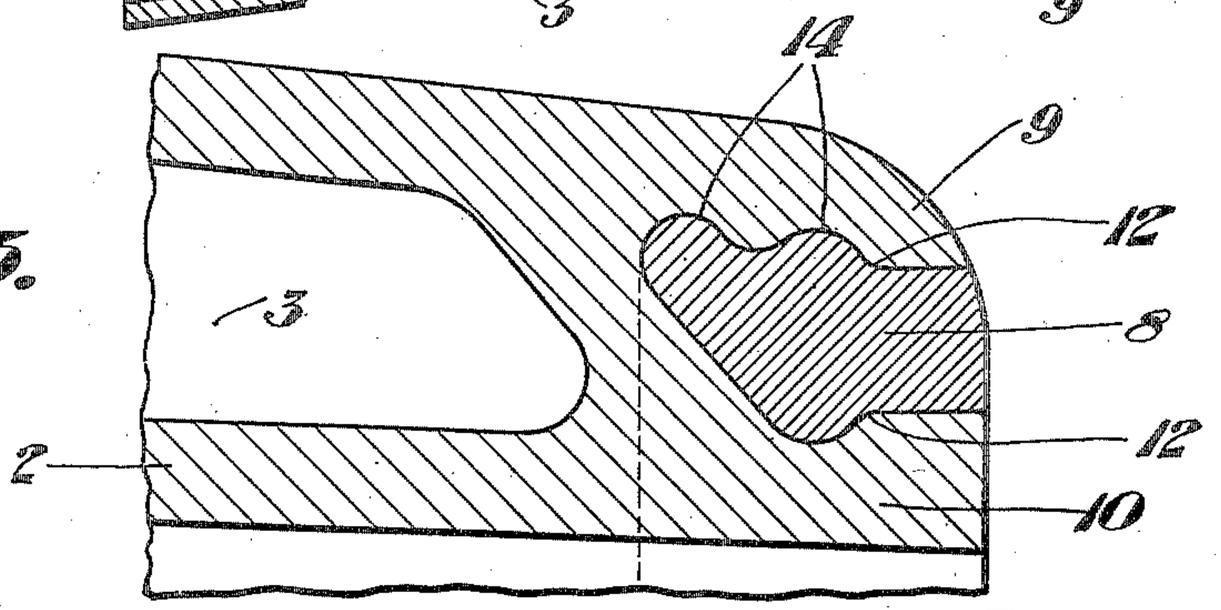


Fig. 3.



Witnesses:

Edwin Trueb

Inventor:

GEORGE W. VREELAND,

by: D. Anthony Rosina

his Attorney.

Patented Sept. 4, 1928. 1,682,816

UNITED STATES PATENT OFFICE.

GEORGE W. VREELAND, OF STEUBENVILLE, OHIO.

TUYÈRE.

Application filed July 8, 1927. Serial No. 204,356.

This invention relates to blast furnace tuyères, and has for its primary object the provision of a tuyère having an improved form of nose which will not burn away or be destroyed as readily as the tuyères heretofore commonly used.

Heretofore, tuyères composed entirely of bronze or copper, or having body portions composed of bronze or copper and having their nose portions composed of refractory material have generally been used in blast furnaces. Tuyères having their nose portions composed of refractory material have a relatively longer life than those composed wholly of copper or bronze. However, experience has shown that even the refractory nose tuyères last but a short time, due to the fact that the refractory material becomes rapidly eroded by the blast and slagging action leaving the ragged bronze or copper shell which previously contained the refractory material. The destruction of the refractory nose of the tuyère shortens the length of the tuyère so as to lessen its effectiveness and also permits the intense heat of the furnace to act directly on the tuyère body so that the tuyère is readily destroyed.

The present invention overcomes the objections to the all bronze or copper tuyères and the refractory nose tuyère, by providing a nose portion which will withstand higher temperatures than the bronze or copper of the tuyère body, and which will conduct heat away from the nose much faster than is possible with refractory material.

In the drawings—

Figure 1 is a plan view of the outer or rear end of a tuyère constructed in accordance with this invention.

Figure 2 is a plan view of the inner or nose end thereof.

Figure 3 is a sectional elevation on the line III—III of Figure 1.

Figure 4 is an enlarged sectional view through the nose end of the tuyère.

Referring more particularly to the drawings, the numeral 2 designates the body of the tuyère as a whole, which is preferably composed of bronze or copper, and cast integral. The body 2 is of the usual tapering cylindrical construction, having the annular water-jacket 3. A water inlet 4 and a water outlet 5 are provided into which are threaded the usual water inlet and outlet pipes (not shown). In order to facilitate the removal of the core used in casting the hollow water-jacket or recess 3, ports 6 are provided in the rear wall of the tuyère which ports are closed by threaded plugs 7.

The tuyère nose is provided with a cast iron nose ring 8 which is preformed and cast into the nose of the tuyère so that it is held in position by extensions 9 and 10 of the side walls of the tuyère body.

The ring 8 has its nose end reduced in thickness to form shoulders 12 and has its outer circumference grooved to form retaining ridges or rings 14. The extensions 9 and 10 of the side walls of the tuyère, as stated above, are cast around the ring 8 and so interfit with the irregular outline of the cast iron nose ring 9 and securely hold it in place.

The nose end of the ring 9 extends through the nose end of the tuyère so as to form a continuous wear ring.

Cast iron has a much higher melting temperature than either bronze or copper and also has a less coefficient of expansion than either bronze or copper. Therefore the cast iron will be affected less by the high temperatures of the blast furnace and, further, will expand to a less degree than the bronze or copper walls 9 and 10 of the nose portion, so that there will be no danger of the fracture of said walls by the expansion of the cast iron ring.

The cast iron ring 8 being in direct contact with the bronze or copper body of the tuyère will rapidly conduct the heat from the nose to the water in the water-jacket 3, therefore maintaining the temperature of the nose below the destructive temperatures, and the cast iron, due to its inherent qualities, will be less likely to be corroded and worn away by the slagging action of the furnace, therefore resulting in a longer life for the tuyère and also in maintaining the tuyère at its maximum length for a greater time than is possible with tuyères of the prior art.

While I have shown and described one specific embodiment of my invention, it will be understood that I do not wish to be limited thereto since various modifications may be made without departing from the

scope of my invention as defined in the appended claims. For example, while cast iron preferably is used for making the nose ring, other metals such as nickel and steel may be employed.

I claim—

1. A blast furnace tuyère comprising a cylindrical body portion having an annular water-jacket formed therein, and a solid nose portion formed on said tuyère, said nose portion being composed of a shell formed integral with the body of the tuyère, and a cast iron ring within said shell.

2. A blast furnace tuyère comprising a cylindrical body portion having an annular water-jacket formed therein, and a solid nose portion formed on said tuyère, said nose portion being composed of a shell formed from extensions of the side walls of said tuyère, and a cast iron center mounted within said shell.

3. A blast furnace tuyère comprising a cylindrical body portion having an annular water-jacket formed therein, and a solid nose portion formed on said tuyère, said nose portion being composed of a pair of side walls forming continuations of the side walls of said tuyère and a separate metal ring mounted between said side walls, said body portion and said side walls of said nose being integral and composed of a metal having a lower melting point and a higher coefficient of expansion than the metal from which said ring is formed.

In testimony whereof, I have hereunto set my hand.

GEO. W. VREELAND.