March 7, 1950 E. M. NEELY 2,500,089

COMPOSITE BLAST FURNACE TUYERE

Filed March 6, 1947 2 Sheets-Sheet 1

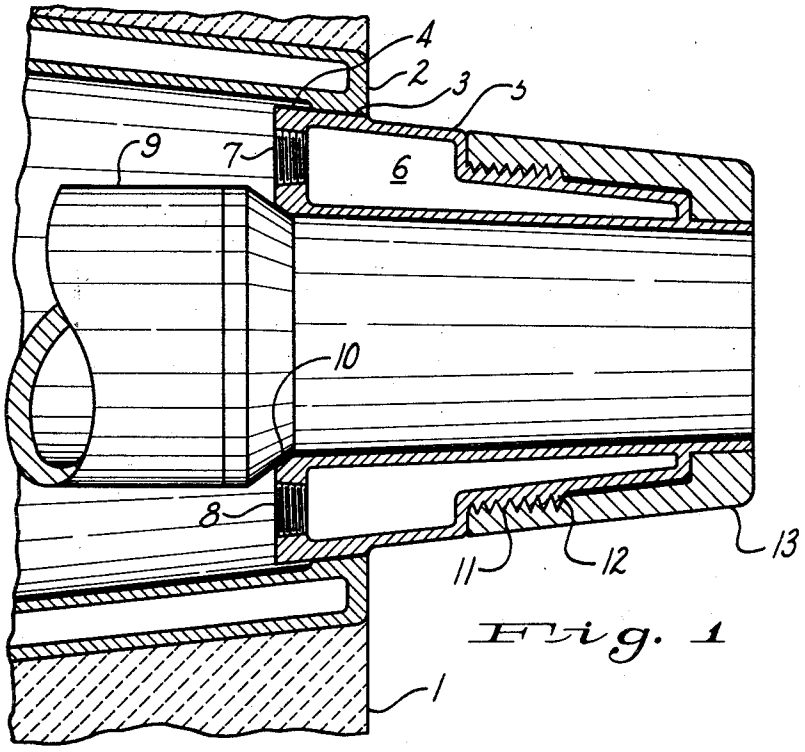


Fig. 1

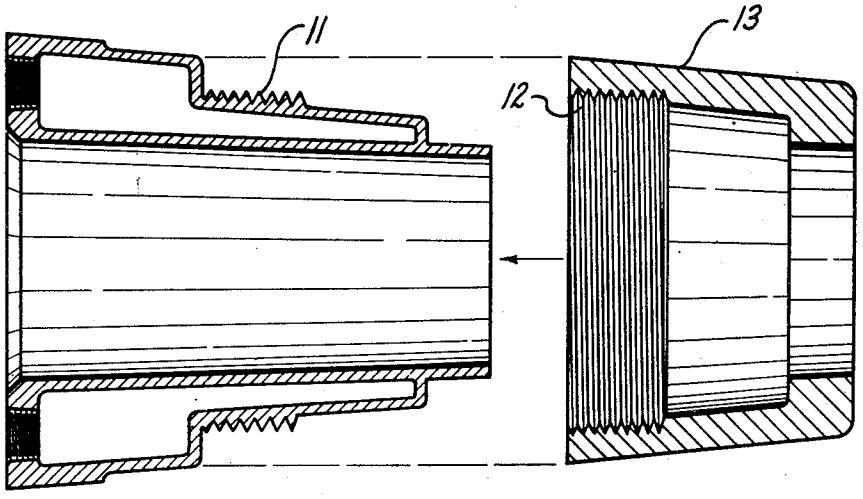


Fig. 2

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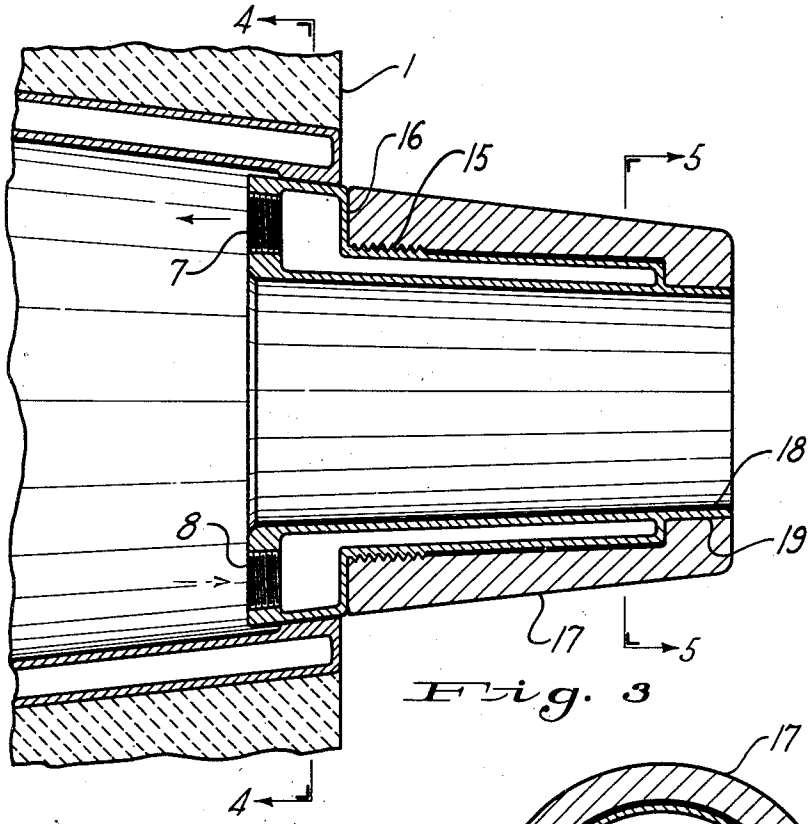


Fig. 3

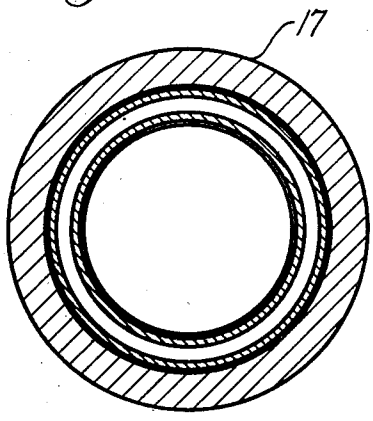


Fig. 5

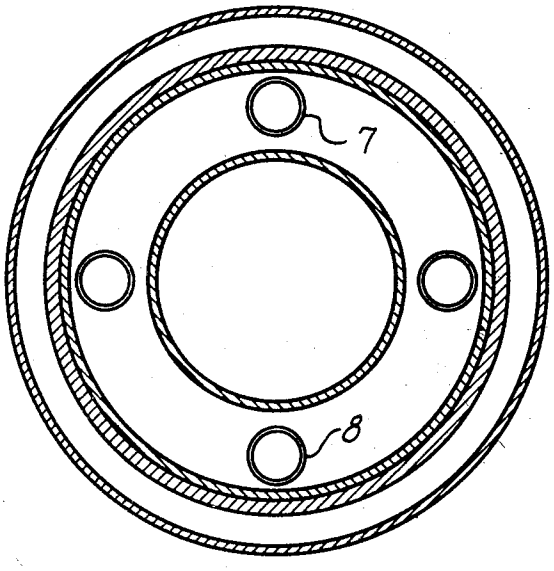


Fig. 4

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UNITED STATES PATENT OFFICE

2,500,089

COMPOSITE BLAST FURNACE TUYÈRE

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Application March 6, 1947, Serial No. 732,738

2 Claims. (Cl. 266—41)

1

This invention relates to blast furnace tuyères and more particularly to a composite tuyère structure consisting of double copper walls for maintaining a circulating flow of cooling medium in the body of the tuyère and a graphite nose or end to protect the tuyère from burning through to the circulating chamber.

The invention will become more apparent from a consideration of the accompanying drawings, constituting a part hereof, in which like reference characters designate like parts, and in which

Fig. 1 is a vertical cross sectional view, partially in elevation, of a composite blast furnace tuyère embodying the principles of this invention;

Fig. 2 an exploded view in vertical section showing the copper tuyère body and the graphite nose;

Fig. 3 a vertical cross sectional view of a modified form of composite tuyère structure;

Fig. 4 a cross sectional view taken along the line 4—4, Fig. 3; and

Fig. 5 a cross sectional view through the nose of the tuyère taken along the line 5—5, Fig. 3.

In the drawings the numeral 1 designates the furnace brickwork having an opening in which is placed the tuyère cooler 2 which is provided with a constricted end 3 which receives the tapered body 4 of a copper tuyère, generally designated by the reference numeral 5. The tuyère is provided with a circulating chamber 6 communicating by threaded openings 7 and 8 with a water cooling system. A blow pipe 9 is disposed in the tuyère opening and is adapted to seat on the chamfered inner wall 10 of the tuyère. As shown in the exploded view in Fig. 2, the tuyère body is provided with a threaded portion 11 for receiving the threads 12 of a graphite sleeve 13 which, when placed on the tuyère as shown in Fig. 1, provides a protecting nose for the tuyère body. Thus, even if the graphite sleeve 13 contacts the stock in the furnace its melting temperature is very much greater than that of any part of the furnace so that the graphite nose will not burn away and expose the copper member.

In the form of the device shown in Fig. 3, the same composite construction of copper tuyère and graphite nose is employed, but the threaded portion 15 is brought back against the shoulder 16 that is in substantial alignment with the brick of the furnace wall 1. The graphite sleeve 17 protects the entire tuyère nose and is supported on the tuyère both at the threaded end 15 and on the constricted portion 18 that seats on the sleeve bearing 19 at the end of the nose.

2

The graphite sleeve is practically always in an inert atmosphere since the oxygen-laden air from the air nozzle 9 passes through the tuyère opening and is projected into the furnace interior. The oxygen therefore does not combine with the carbon of the graphite sleeve to support combustion.

The tuyère body itself retains the proved characteristics of modern copper tuyères in that it has a water cooled body portion and is fitted into the tuyère cooler and connected to the cooling circulating system in the same manner as other standard types of tuyères while it is protected against burn-outs by the graphite sleeve or nose.

Although several embodiments of the invention have been illustrated and described, it will be evident to those skilled in the art that various modifications may be made in the details of construction without departing from the principles herein set forth.

I claim:

1. A composite tuyère structure for blast furnaces and the like comprising a hollow metal sleeve of substantially frusto-conical shape having a shoulder adjacent the furnace wall and having a graphite nose mounted thereon extending substantially the full length of the tuyère body that is exposed to the furnace interior, said tuyère body and graphite nose having threaded body portions adjacent said shoulder interacting to securely mount the same, said graphite portion having an end wall of substantial thickness for enveloping the metallic nose.

2. A tuyère for blast furnaces comprising a hollow metallic member having a shoulder substantially flush with the furnace wall and having a threaded portion adjacent said shoulder, a graphite nose extending the full length of the tuyère from the shoulder to the nose having a threaded end for interacting with the thread of the tuyère mounted on said tuyère and having a heavy wall portion enveloping the outer wall and nose of the tuyère, said tuyère being hollow for circulating a cooling medium therein.

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The following references are of record in the file of this patent:

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