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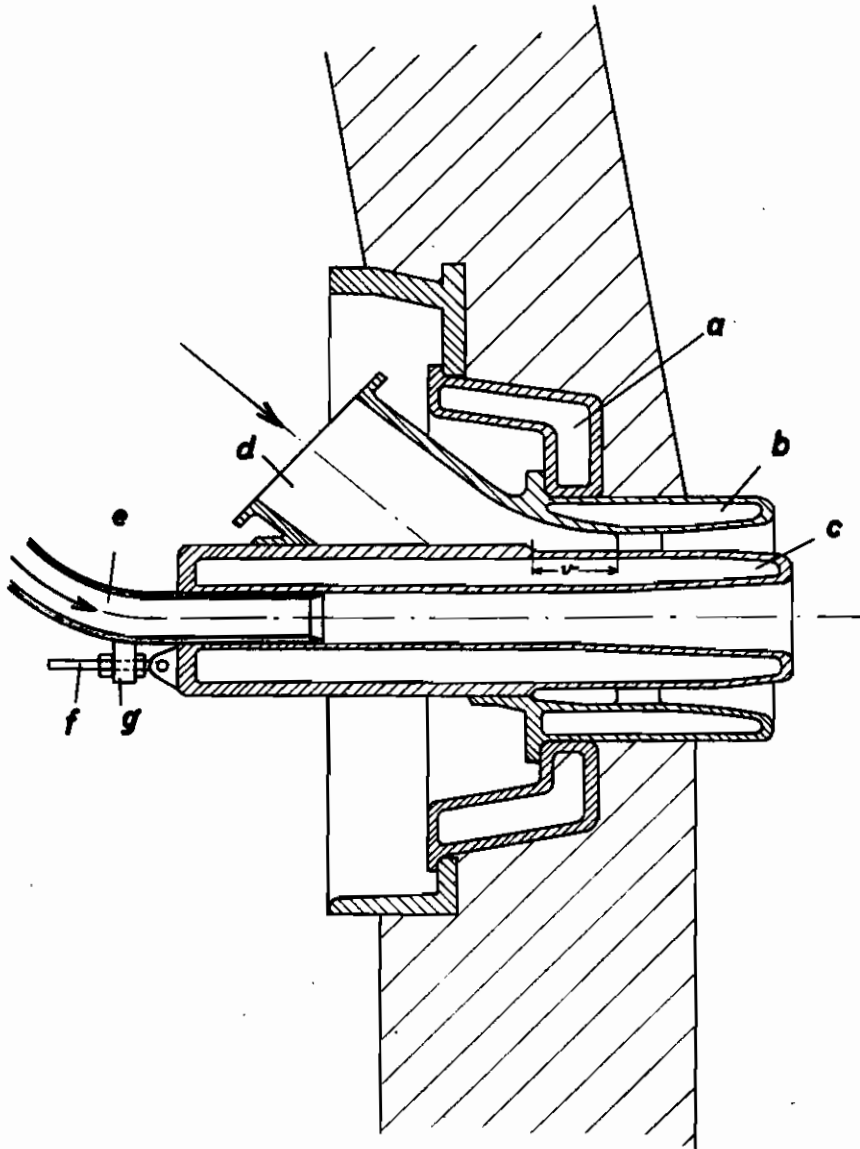
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METHOD AND APPARATUS FOR INCREASING THE OUTPUT
OF SHAFT FURNACES, ESPECIALLY BLAST FURNACES
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ALIEN PROPERTY CUSTODIAN

METHOD AND APPARATUS FOR INCREASING THE OUTPUT OF SHAFT FURNACES, ESPECIALLY BLAST FURNACES

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It is known that the output of shaft furnaces, especially blast furnaces, increases not in proportion to the increase in the hearth surface area but less. This is due to the fact that the blast entering radially through the tuyeres only penetrates to a certain depth into the furnace. Therefore, only an annular space is provided with the necessary quantity of air for combustion, whereas only an insufficient quantity of air for combustion is supplied to the inner circular area of the furnace.

An obvious procedure is, to increase the blast pressure so that the air penetrates to the middle of the furnace. However, the general increase in the blast pressure is accompanied by the disadvantage that too much air is blown into the outer annular space so that here a cooling effect occurs which makes an increase in output impossible or even reduces the output and thus renders the running of the furnace uneconomical.

The present invention relates to a method and a tuyere for producing higher outputs in shaft furnaces, especially blast furnaces. It consists in the multiple section construction of the tuyeres in such a manner that not only blasts of different pressure can be injected at the same time but, if desired, air of different pressure or different temperature or with different content of oxygen is injected selectively combined in such a manner that at least one of the blasts has such a high pressure that the air reaches the middle of the furnace.

The great advantage of this method is that a blast of the ordinary pressure can be introduced for supplying the outer annular surface of the hearth cross-sectional area with the necessary air for combustion, but at the same time a blast can be introduced which possesses the necessary pressure and other properties which make it suitable for causing and accelerating the desired combustion and reduction processes in the interior of the furnace.

The blast destined for the middle of the furnace is preferably enriched with oxygen and more strongly heated, so that the combustion and reduction processes are accelerated and an increase in the output of the furnace is attained.

To ensure that the blast penetrates as deeply as possible into the furnace in the sense of this method, a tuyere is used according to the invention which consists of several sections and is constructed from a flow technical point of view so that an air current which remains united as long as possible can penetrate into the interior of the furnace. For this purpose one or more tuyeres are arranged mutually shiftable and adjustable within an ordinary tuyere so that the nozzles of the tuyeres project into the furnace in different planes.

A form of construction of a two section tuyere is illustrated by way of example in longitudinal section in the only figure of the accompanying drawing.

The cooling box let into the masonry of the blast furnace is designated by *a*, the outer section of the tuyere by *b* and the inner section by *c*. Blast at normal pressure enters through the pipe connection *d*, whereas a blast with a higher pressure and temperature, if desired enriched with oxygen, is introduced through the rigidly mounted pipe *e*. The inner tuyere section *c* is shiftable relative to the outer tuyere section *b*, the mutual adjustment being effected by a fitting *f* supported by a lug *g* on the pipe *e*. The extent of the relative adjustability of the two tuyere sections *b* and *c* is determined by the distance *v*.

The mutual arrangement of the individual tuyere sections has no bearing on the scope of the invention, they may be arranged concentrically or eccentrically, horizontal or at an incline to one another.

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