OXYGEN TOYERE OF A STEEL-MELTING MILL

Inventors: Boris Semenovich Chaikin, Moscow; Lev Ivanovich Kozlov, Khimki Moskovsko oblasti; Thomas Vasilievich Malchenko; Konstantin Dmitrievich Mokrushin, both of Cherepovets Vologodskoi; Lev Volfovich Yarovsky, Moscow; Grigory Efimovich Maryanchik, Moscow; Boris Stepanovich Zhelnov, Moscow; Vasily Mikhailovich Tarasov, Moscow; Kirill Mikhailovich Trubetskoy, Moscow; Igor Konstantinovich Borschevsky, Moscow; Dmitry Pavlovich Chemensky, Vinnoe Moskovskoi oblasti, all of U.S.S.R.

Assignee: Gosudarstvenny Sajuzny Institut Po Proektirovanjuagregatov Staliteinogo I Prokatnogo Proizvodstva Dlya Chernoi Metallurgii, Moscow, U.S.S.R.

Filed: Feb. 2, 1971
Appl. No.: 111,926

The present invention relates to an oxygen tuyere of a steel-melting mill, whose body has pipes for supplying oxygen, a cooling medium and a shielding gas, coaxially arranged therein. The lower portion of the body of the tuyere has nozzles for supplying oxygen into liquid metal and slot-like nozzles for supplying a shielding gas, disposed above the former ones and forming a spiral, at least, a double-turn one, which embraces the body along its periphery.

1 Claim, 2 Drawing Figures
The invention relates to the field of production of steel by way of blowing oxygen through liquid metal in a steel-melting mill, e.g., a furnace or a converter, and, more particularly, to an oxygen tuyere installed in said mill.

An oxygen tuyere of a steel-melting mill, whose body has pipes for supplying oxygen, a cooling medium and a shielding gas, coaxially arranged therein, is known. The lower portion of this body has nozzles for supplying oxygen into liquid metal, communicated with a duct, along which oxygen is delivered, and nozzles for supplying a shielding gas, arranged above the former nozzles and communicated with the interpipe space along which a shielding gas is delivered. The latter nozzles are made cylindrical, are equidistantly spaced from one another and are arranged along an imaginary circumference along the periphery of the body of the tuyere (cf. British Pat. No. 934,112; Cl. 51(I)b, 1962).

The nozzles supplying a shielding gas create a gas shield intended to decrease the amount of iron oxides (“brown smoke”) carried away from the working space of the metallurgical unit, and, therefore, to raise the output of ready metal; to prevent drops of metal and slag from getting onto the ceiling and walls of the steel furnace, and, therefore, to preclude premature damage of the furnace; and to provide for a more complete combustion of carbon oxide separated in the course of the blowing-through, and, consequently, to raise the temperature of the slag and to decrease its foam-formation, which improves the transfer of heat to the metal and prevents the latter from being carried away with the slag being removed.

In the known tuyere, however, this gas shield has a plurality of “ports” whose number depends on the distance between adjacent nozzles. Through these “ports” of the shield carbon oxide penetrates and is carried away from the working space, and drops of the metal and slag get onto the ceiling and walls of the steel furnace.

In the known tuyere the nozzles cannot be brought closer to one another as it is necessary to provide a jacket of the cooling medium around every nozzle, since otherwise the tuyere will burn out.

This contradiction leads to the fact that in the conventional tuyere of a steel-melting mill there is no continuous screen from the shielding gas, which results in all negative consequences following therefrom, and the tuyere proper has a low resistance due to its poor cooling in the zone of disposition of the nozzles for supplying the shielding gas.

Thus, the problem lies in decreasing the number of the “ports” in the gas shield and, at the same time, in taking measures aimed at preventing the worsening of the conditions of the tuyere cooling in the zone of disposition of the nozzles supplying the shielding gas.

An object of the present invention is to provide such an oxygen tuyere of a steel-melting mill, that would create a continuous shielding screen above the liquid metal in the steel-melting mill.

Another object of the present invention is to provide such an oxygen tuyere that would be sufficiently cooled in the zone of disposition of the nozzles supplying a shielding gas.
slots forming a spiral, at least a double-turn one, which embraces said body along its periphery, and communicated with an inter-pipe space along which said shielding gas is supplied.