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METHOD OF AND APPARATUS FOR INSPECTION AND CONTROL OF THE
REACTION PERFORMANCE DURING THE OXYGEN BLOWING PROCESS
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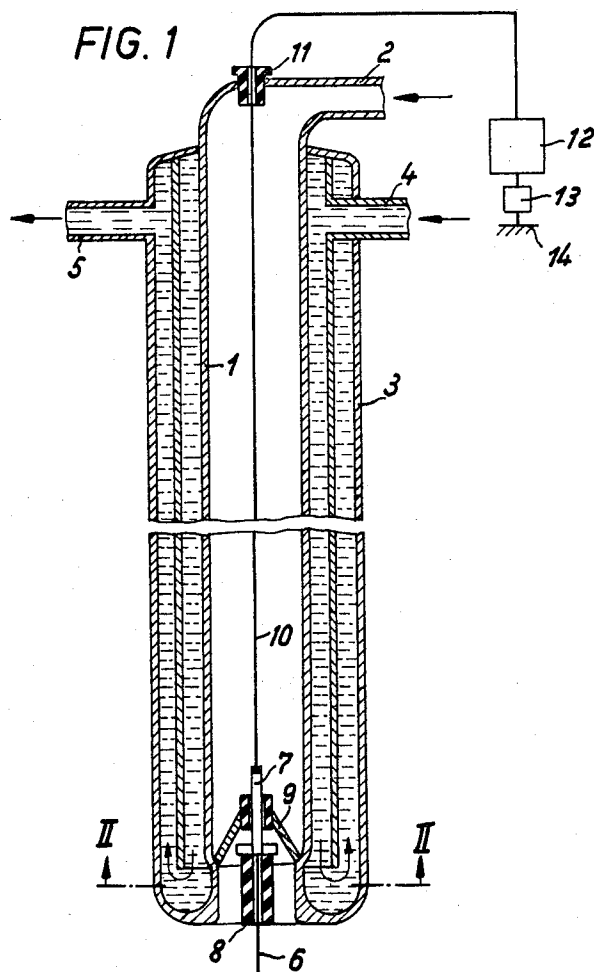
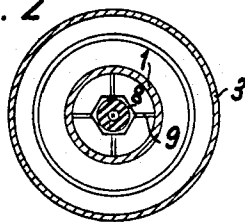


FIG. 2



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METHOD OF AND APPARATUS FOR INSPECTION AND CONTROL OF THE REACTION PERFORMANCE DURING THE OXYGEN BLOWING PROCESS

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5 Claims. (Cl. 266—34)

ABSTRACT OF THE DISCLOSURE

An apparatus for inspection and control of the reaction performance in a converter during the oxygen blowing process of refining molten metal comprising a hollow blowing lance for passing pressurized oxygen therethrough, and a metallic conducting member extending axially through and beyond the discharge end of the lance supported and insulated from the walls thereof. A means for measuring electrical conductivity is provided and an electrical conducting wire extends axially through the lance connecting the conducting member and the means for measuring electrical conductivity.

The present invention relates to a method of and an apparatus for inspection and control of the reaction performance during the oxygen blowing process.

A method of inspection and control of the reaction performance during the oxygen blowing process is disclosed in the copending application, Ser. No. 441,484, filed Mar. 22, 1965, now abandoned, wherein the electrical conductivity, which is dependent upon the reaction performance between the electrically insulated blower tube and a metal bath in a converter during the oxygen blowing process of refining molten metal, is determined and is used for the control of the reaction performance. It has been there also provided to determine the electrical conductivity between a particular probe and the metal bath.

It is one object of the present invention to provide a method of and an apparatus for inspection and control of the reaction performance during the oxygen blowing process, wherein the electrical conductivity between a probe, electrically insulated relative to the blowing lance and projecting from the blowing lance perpendicularly into the free stream, and the metal bath is measured.

An electrical insulation of the blowing lance with its water- and oxygen-feeding conduits towards ground is not required.

With this and other objects in view which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawing, in which:

FIGURE 1 is a vertical section of the apparatus designed in accordance with the present invention; and

FIG. 2 is a section along the lines 2—2 of FIG. 1.

Referring now to the drawing, the blowing lance comprises substantially a tube 1 into which pressurized oxygen is fed through a conduit 2 and which tube 1 is surrounded by a cooling member 3, whereby the cooling water is fed into the cooling member 3 through a conduit 4 and emerges from a conduit 5. A probe or electrically conducting member 6 is secured to the probe foot 7, which is electrically insulated against holding means and projects through a refractory insulating body 8, which is secured to the probe foot 7, into the free stream of

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oxygen fed into the tube 1. The probe foot 7 is retained in the tube 1 by means of supports 9. The probe 6 is connected with a device 12 for the determination of the electrical conductivity and of the voltage, respectively, under circumstances with a current source 13 and ground 14, and with a circuit with the engaging parts of the metallurgical device, respectively, by means of an insulated wire 10, which is fed into the tube 1 by means of an insulating body 11. The probe 6 consists of metallic material, for instance, copper or a high melting precious metal alloy, which metallic material is not sensitive against pressurized oxygen. The probe 6 is cooled in the embodiment shown in the drawing by the depressurizing pressurized oxygen. It melts and burns, respectively, up to the point, where the oxygen stream reacts with the reaction gases present in the reaction vessel. It is also possible to provide water cooling for the probe 6. The securing of the probe 6 in the probe foot 7 should be arranged such, for instance, by means of a threaded connection, that the probe 6 can be easily exchanged.

The conductivity curves obtained in accordance with the present invention correspond with that of the method disclosed in the said copending patent application, Ser. No. 441,484.

The resistance of the probe against ground, as in the method of said copending application, should be high and preferably 10,000 ohms or more. The resistance can be, however, also appreciably lower. Even at the resistance of only 10 ohms against ground, usable results can be obtained.

The present invention is applicable, for instance, to the conventional oxygen blowing converters and also in connection with rotating finery vessels, for instance, Kaldo-converters. In the case of using nozzles, having a plurality of perforations, it suffices if one probe is provided in one blowing nozzle only.

While we have disclosed one embodiment of the present invention, it is to be understood that this embodiment is given by example only and not in a limiting sense, the scope of the present invention being determined by the objects and the claims.

We claim:

1. An apparatus for inspection and control of the reaction performance in a converter during the oxygen blowing process of refining molten metal, comprising a hollow blowing lance, means for passing pressurized oxygen in the form of a blowing stream through said hollow blowing lance, an electrically conducting metallic member disposed in and secured to said blowing lance, said member extending axially through the discharge end of said lance and extending outwardly beyond said discharge end and consisting of a metallic material not sensitive to pressurized oxygen, means for supporting and insulating said metallic member from the walls of said lance, means for measuring electrical conductivity, and an electrical conducting wire extending axially through said lance and connected between said metallic member and said means for measuring electrical conductivity.

2. The apparatus, as set forth in claim 1, wherein said blowing lance comprises a tube, said means for supporting and insulating said metallic member adapted for releasable connection for easy exchangeability.

3. The apparatus as set forth in claim 1 wherein said means for passing pressurized oxygen includes at least one discharge orifice, and said metallic member passes through one of said at least one discharge orifice.

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4. The apparatus, as set forth in claim 2, wherein said metallic member consists of copper.

5. The apparatus, as set forth in claim 2, wherein said metallic member consists of a precious metal alloy.

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