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REFRACTORY LININGS FOR CHAMBERS FOR DEGASIFYING METALS

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Vacuum chambers with highly refractory linings made, for example, of magnesite blocks, are frequently used for degasifying metals such as steel. It has been found that the durability of the chamber linings is considerably inferior to that of similar linings of other metallurgical apparatus. This is because slag introduced into the degasifying chamber with the molten metal infiltrates into the lining with the resultant deterioration of the lining. This deterioration is particularly noticeable under reducing conditions. It is virtually impossible when charging the chamber with molten metal to prevent some slag from entering the chamber.

In accordance with the present invention the durability of such linings is increased by covering them with an aluminum oxide and silicon dioxide coating which is viscous at operational temperatures. The coating, which may be approximately 2 to 3 mm. thick may also contain magnesium oxide and a fluxing agent such as fluorspar.

The coating may be applied to the lining in a number of different ways as exemplified in the following examples.

In a first example, a pulverulent mixture of aluminum oxide and silicon dioxide, preferably containing a fluxing agent and some magnesium oxide, is applied to the lining when cold. The vacuum chamber is subsequently brought up to its operational temperature in the usual way whereupon the protective coating becomes viscous. In this state it covers the masonry lining uniformly and closes the surface pores of the lining. This prevents the infiltration into the refractory masonry of slag which enters the vacuum chamber together with metals to be degasified.

In a second example, the refractory lining of the chamber is provided with two protective layers, the bottom consisting of pure sand and the top one, of a pulverulent mixture of aluminum oxide and silicon dioxide, again preferably with a fluxing agent and some magnesium oxide. The chamber is subsequently heated to operational temperature and the two coatings produce a viscous layer which protects the lining by penetrating into and closing the pores of the lining blocks as before.

In a third example, an initial charge of molten steel or other metal to be degasified in the vacuum chamber is drawn off slag free from a furnace in a ladle and it is then covered with a synthetic slag consisting of aluminum oxide and silicon dioxide, preferably again together with a fluxing agent and some magnesium oxide. The metal and the synthetic slag are then introduced into the vacuum chamber and the slag remains in the form of a viscous coatings on the chamber lining after the steel has been degasified and drawn off from the chamber. As an alter-

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native step, the artificial slag may be introduced into the chamber separately after the slag free metal has been introduced into the chamber to be degasified.

The protective coating on the lining should be renewed after approximately every tenth charge.

A particularly suitable composition of the protective coating has been found to consist of 55% sillimanite (65% Al_2O_3 , 35% SiO_2); 30% MgO ; 10% Al_2O_3 and 5% fluorspar.

I claim:

1. A method of increasing the durability of refractory linings covering the interior of vacuum chambers for degassing molten steel, the steps of, covering said lining with a pulverulent mixture of aluminum oxide and silicon dioxide which is viscous at the pouring temperature of molten steel, and heating said vessel to the pouring temperature of molten steel whereupon said coating becomes viscous.

2. A method of increasing the durability of refractory linings of vacuum chambers for degassing molten steel, the steps of, covering slag free metal to be degassed with a slag containing aluminum oxide and silicon dioxide, introducing the molten metal into said vacuum chamber for degassing, and withdrawing the molten steel from said chamber to coat said lining with said slag.

3. A method of increasing the durability of refractory linings of vacuum chambers for degassing molten steel, the steps of, drawing slag free molten steel into said chamber, introducing into said chamber a slag consisting of aluminum oxide and silicon dioxide to cover said molten steel, and withdrawing the molten steel from said chamber to coat said lining with said slag.

4. A vacuum chamber for degassing molten steel, a refractory lining covering the interior of said chamber, a coating covering said lining and including aluminum oxide and silicon dioxide, said coating being viscous at the pouring temperature of molten steel.

5. The chamber set forth in claim 4 wherein said coating also includes magnesium oxide.

6. The chamber set forth in claim 5 wherein the coating also includes a fluxing agent.

7. The chamber set forth in claim 6 wherein said fluxing agent is fluorspar.

8. The chamber set forth in claim 4 wherein the coating consists of 55% sillimanite (55% Al_2O_3 , 35% SiO_2), 30% magnesium oxide, 10% aluminum oxide and 5% fluorspar.

9. The chamber set forth in claim 4 wherein said lining has a base layer of sand and said coating is disposed on said sand.

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