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METHOD OF PRODUCING CHROMIFEROUS STEELS

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The present invention relates to a method of producing chromiferous steels.

It has proved to be advisable to alloy a few percent of chromium with steels used in certain fields of applications, for instance steels which ought to have a special close-grained structure, a larger resistance to wear and which ought to be of higher hardenability of better tempering quality, or for steels used for making permanent magnets and so on.

In the production of all these kinds of steel in practice hitherto always a charge free of chromium has been used in carrying out the hearth refining process and the chromium necessary has been added later on in the form of ferrochromium, because the presence of chromium in the ordinary basic open hearth process offers the difficulty of forming a foamy and viscous slag which strongly impedes the heating of the metal bath and which due to its viscosity may only be removed from the furnace with difficulty.

Hitherto, therefore, a chromiferous charge for the production of chromiferous steel has been very undesired, no matter whether the pig and scrap method, the pig and ore method or the hearth refining method was used. In the electric steel making process only it has hitherto been possible by suitably treating the charge to utilize the valuable chromium content of the charge also for the final product, i. e. the chromiferous steel, but this requires the installation of an electric steel plant.

Conditions similar to those existing in the hearth refining method are encountered in connection with the purifying process. When operating in the ordinary manner one portion of the chromium content of a liquid chromiferous pig iron is slagged, whereas the other portion remains in the steel. However, these amounts of chromium passing into the steel were difficultly to be controlled only and a later addition of chromium in the ladle then may hardly be carried out with sufficient reliableness.

All these difficulties are avoided by the method according to the invention which is characterized by the fact that a chromiferous charge having at least 0,10% of chromium obtained for instance from the refining of chromiferous ores are refined in accordance with the acid method for such a period of time only that the essential content of chromium remains in the bath without being oxidized. Surprisingly, it has been ascertained that when carrying out acid refining the chromium of the solid or liquid charge is maintained in its original quantity. The silicon always present in the steel when carrying out the acid method, evidently has a protecting action, because oxidation of the silicon takes place before the chromium content of the charge is slagged. In this manner steels alloyed with chromium which are used for many fields of applications may be directly produced from chromiferous iron ores maintaining the chromium content of the latter. It is, of course, of no importance, whether the chromium content of the charge originates from the pig iron or from the scrap. With a chromium content of at least 0,10% calculated according to the metallic charge, i. e. neglecting additions for the slag formation and so on, the invention has advantages only, because with lower contents of chromium the above mentioned difficulties are not encountered.

The acid refining for the production of chromiferous steels according to the present invention may be carried out in accordance with the hearth refining method as well as with the purifying process. In carrying out the process an acid lining and an acid slag are used.

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