

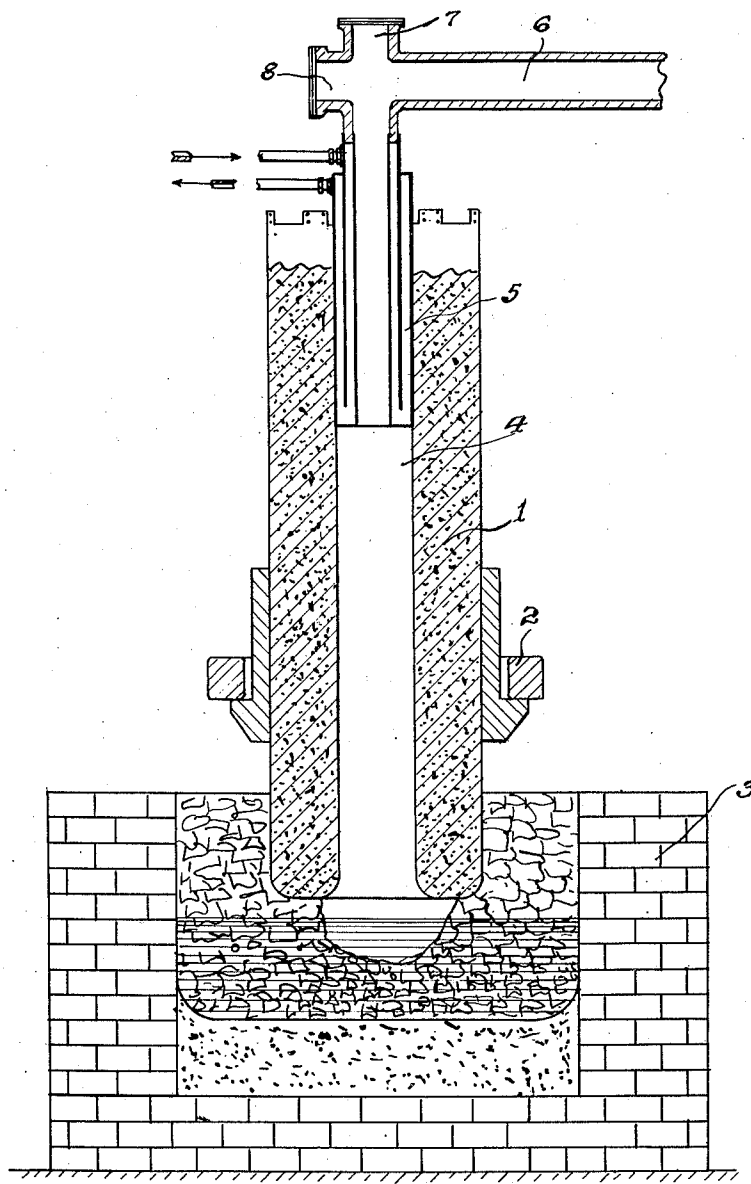
Aug. 30, 1927.

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1,640,735

PROCESS OF MAKING CHANNELED CONTINUOUS ELECTRODES

Filed May 10, 1924



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PROCESS OF MAKING CHanneled CONTINUOUS ELECTRODES.

Application filed May 10, 1924, Serial No. 712,423, and in Norway May 16, 1923.

This invention relates to channeled continuous electrodes for electric furnaces and the object of the invention is a process for making such electrodes whereby first class mechanical and electric qualities are obtained.

In my U. S. Patent No. 1,442,031 I have described a method of producing channeled continuous electrodes. My present process is an improvement of the process described in that patent and is preferable in such cases when very hot gases or charges pass through the electrode.

My present process may be used in connection with any type of electric furnace and the suspension of my electrode may be carried out as desired in each special case. It will especially be advantageous in connection with closed furnaces and makes it possible to carry out therein a number of processes which have hitherto only been carried out in open furnaces, as for instance the production of carbide, and many products which get lost in open furnaces may now be recovered. As an example I may state that a carbide furnace per ton carbide gives about 372 kg. of carbon monoxide which carry along about 204 kg. of dust. Instead of being disagreeable to the neighbourhood of the furnace these products may be recovered by employing my channeled electrode.

In order to carry out my invention I provide a usual continuous selfbaking electrode with one or more longitudinal channels. Such electrodes consist of a lower baked part and an upper unbaked part. I have found that it is essential to the production of a first class electrode to always maintain a part of the electrode in unbaked condition in order to give a homogeneous connection with the new electrode mass to be tamped thereupon. If now in the case of a channeled electrode very hot furnace gases are drawn out through the electrode the upper part of the electrode may become baked by the heat given off from the gases. The same may of course take place if very hot gases are introduced through a channeled electrode. I have now found that this difficulty may be avoided by placing a cooled tube in the channel or channels at the upper end of the electrode. The cooled tube will then protect the surrounding raw electrode mass from being baked. The tube may either be in solid connection with the col-

lecting arrangements for the furnace gas or in solid connection with the electrode and in flexible connection with said collecting arrangement. As the electrode is lowered the unbaked electrode mass outside the tube will follow downwards. Consequently the tube must from time to time be raised if it is in solid connection with the electrode. I may of course also heat insulate such a tube instead of cooling it so as not to bake the surrounding electrode mass.

In the drawing forming part of the application a vertical sectional view of an electrode and furnace used in carrying out my invention is shown:

Referring more particularly to the drawing, 1 is a continuous selfbaking electrode suspended by means of an external holder 2. 3 is an electric furnace. 4 is a longitudinal channel inside the electrode. 5 is a water cooled tube in the unbaked part of the electrode. 6 is the outlet for the furnace gas, 7 and 8 are openings for cleaning the tubes.

When the furnace is in operation a strong draft will on account of the great heat form in the channel 4 acting as a flue and I may now regulate the draft in such manner that the gases formed in the furnace escape without air being drawn in through the furnace. I may if desired regulate the conditions so that part of the gas escapes each way. The regulation may easily be carried out for instance by means of a door or a fan.

It is easily understood which improvements in the operation of the furnace are obtained by the removal of the furnace gas. The great amounts of hot and intensely illuminating gases which are developed in the usual carbide and ferroalloy furnaces form the principal difficulty in the handling of the furnace. By having the gases removed from the furnace through a hollow electrode all drawbacks are eliminated and the furnace is easily and comfortably handled.

The method described is of special importance when smelting materials in powder or with little porosity. Such material is for instance a mixture of powdered iron ore (purple ore or the like) with powdered coke or similar powdered reduction material. Such powdered materials are generally much cheaper than other raw materials. They have, however, the drawback that the charge becomes too tight and impenetrable for gas.

Consequently the furnace "blows", that is, the gas will force its way through the charge at certain places, forming open channels through which it escapes. Little or no contact between gas and material is therefore obtained and neither the heat content nor the reduction value of the gas is utilized. By drawing gas out through the electrode the blowing is avoided and at the same time the gas is collected and may subsequently be utilized for preheating, roasting or reduction of charges which may partly be charged through the electrode channel in counter current with the gases.

A furnace such as that herein described is especially noteworthy on account of the fact that it possesses in combination the advantages of both an open and a closed furnace.

If the furnace gases contain volatile elements as for instance zinc, phosphorus or the like, these may be recovered as usual by leading the gas through a condensing system connected with the furnace.

As previously stated the process herein described may also be employed for blowing gas into the furnace. If desired I may of course also draw gas through the furnace and the electrode. Such procedures may for instance be employed for effecting reaction of a gas with carbon, for instance in the production of hydrocyanic acid.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. The process of making continuous self-baking channeled electrodes for electric furnaces comprising the introduction of a body in the unbaked part of the electrode protecting the surrounding raw electrode mass against the heat from the channel and thus preventing the baking of said raw electrode mass.

2. The process of making continuous self-baking channeled electrodes for electric furnaces comprising the introduction of a tube in the unbaked part of the electrode protecting the surrounding raw electrode mass

against the heat from the channel and thus preventing the baking of said raw electrode mass.

3. The process of making continuous self-baking channeled electrodes for electric furnaces comprising the introduction of a cooled tube in the unbaked part of the electrode protecting the surrounding raw electrode mass against the heat from the channel and thus preventing the baking of said raw electrode mass.

4. The process of making continuous self-baking channeled electrodes for electric furnaces comprising the introduction of a water cooled tube in the unbaked part of the electrode protecting the surrounding raw electrode mass against the heat from the channel and thus preventing the baking of said raw electrode mass.

5. A channeled electrode baked in the furnace in which it is used and adapted for the introduction into the furnace or removal therefrom of gas, said electrode comprising when in use a baked portion an unbaked portion and within a part of the unbaked portion means for protecting the raw electrode mass against heat from the channel.

6. A channeled electrode baked in the furnace in which it is used and adapted for the introduction into the furnace or removal therefrom of gas, said electrode comprising when in use a baked portion, an unbaked portion and within said unbaked portion a tube protecting the raw electrode mass against heat from the channel.

7. A channeled electrode baked in the furnace in which it is used and adapted for the introduction into the furnace or removal therefrom of gas, said electrode comprising when in use a baked portion, an unbaked portion and within said unbaked portion a water cooled tube protecting the surrounding raw electrode mass against the heat from the channel and thus preventing the baking of said raw electrode mass.

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