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METHOD FOR CONTROLLING THE READINESS OF THE COKE MASS IN THE CHAMBER OF A HORIZONTAL COKE OVEN

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FIG. 2

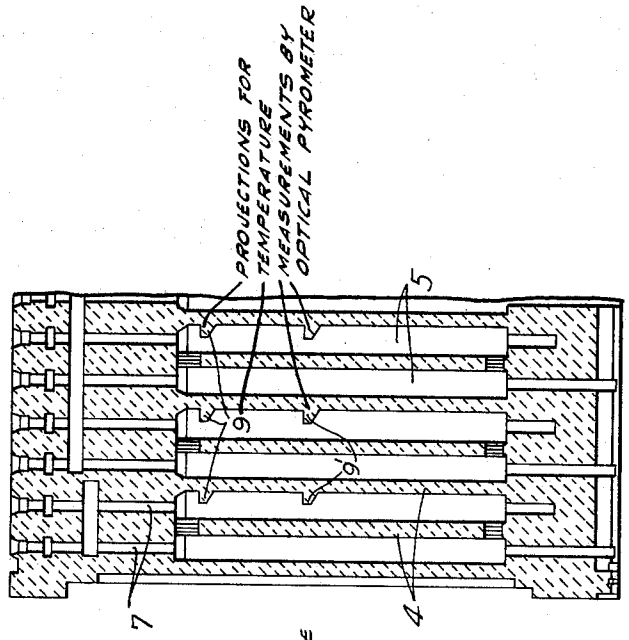
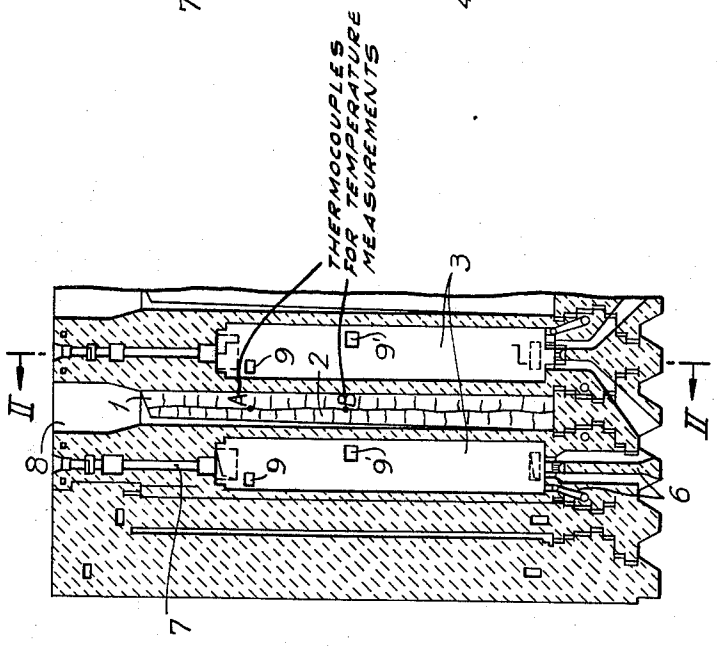


FIG. 1



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METHOD FOR CONTROLLING THE READINESS OF THE COKE MASS IN THE CHAMBER OF A HORIZONTAL COKE OVEN

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U.S. Cl. 201—1 2 Claims

ABSTRACT OF THE DISCLOSURE

A method for controlling the readiness of a coke mass in chambers of horizontal coke ovens comprises measuring the temperature of the coke mass at a plurality of levels while also measuring the temperature of dividing partitions separating the chambers, thereafter establishing a temperature difference, at each of the levels, between the coke mass and the partitions and subsequently determining the temperature of the coke mass under changing control conditions solely by measuring the temperature of the partitions at the above-mentioned levels and correcting for the established temperature difference heretofore determined.

The present invention relates to methods for controlling the readiness of a coke mass in the chamber of a horizontal coke oven during the coking process.

It is well known that for obtaining coke of high quality, it is necessary that during the coking process it should be uniformly heated throughout the entire length and height of the chamber of a coke oven.

As it is known, the uniformity of heating of a burden being coked is determined in horizontal coke ovens by measuring the temperature of the burden by means of thermocouples directly placed into the burden.

This method of controlling the readiness of the coke mass, however, requires considerable time and is labor-consuming, since all the operations, connected with its realization, are carried out by the shop personnel under conditions of a large content of obnoxious gases present in the working chamber and in the high-temperature zone.

For these reasons, the achievement of control by recourse to the conventional method presents difficulties, and this method is employed only for effecting the periodic control of the established conditions of the coke oven firing or if it is required to select the heating conditions, for example, when varying the compositions of the burden being coked.

The control of the heating conditions is effected according to temperature values measured in the firebrick lining of the base of vertical firing channels by the aid of an optical pyrometer. The values obtained by measuring the temperature in the brickwork lining of the base of vertical channels cannot be employed for evaluating the distribution of temperatures throughout the height of the coke mass.

It is well known that the temperature of the burden being coked can vary throughout the height of the firing channels depending upon the height of the coking chamber, the density and composition of the burden, as well as the methods of heating adopted in the coking process. Thus, for example, by varying the volume of air and gaseous fuel supplied, and the rate of their flow into the firing channels, it is possible to control the distribution of temperatures throughout the height of said channels and the length of firing the hollow members so as to provide for a uniform heating of the burden in the coking chamber. As has been shown in practice, a distribution

of temperature of similar type is observed in the burden being coked throughout the height and length of the coking chamber.

It is an object of the invention to provide a method for controlling the readiness of the coke mass in the chamber of a coke oven, the method not requiring the measurements of temperature in the burden being coked.

The present invention contemplates a method for controlling the readiness of the coke mass in chambers of coke ovens, involving the measurement of its temperature at various levels throughout the height and length of coking chambers, provided on both sides with firing hollow members. In conformity with the invention, it is proposed to measure at the same levels the temperature of the refractory lining of division partition walls between the firing channels of the hollow members of coke ovens in order to determine at each of said levels the difference between the temperature of the refractory lining of the partition walls and that of the coke mass, which operation is followed by measuring only the temperature of the refractory lining of the partition walls at the same level in order to determine the temperature of the coke mass while taking into account the established difference of temperatures between the refractory lining of the partition walls and coke mass.

It is expedient to measure the temperature of the refractory lining of the partition walls, for example, by means of a pyrometer evaluating the luminosity of projections made of the same material as the lining of the partition walls, said projections being arranged according to a staggered order and observed through peep channels opening into vertical firing channels of the hollow members.

The advantage of the invention consists first of all in that it simplifies the process of controlling the readiness of the coke mass, since in this case the measurement of the temperature of the coke mass is required only for establishing the difference of temperatures between the refractory lining of the partition walls of the firing hollow members and the coke mass, while the current control is effected by measuring temperatures of the refractory lining of the partition walls provided a correction is made for the established temperature difference at each point to be determined.

The nature of the present invention will become more fully apparent from a consideration of the following description of a possible embodiment thereof, taken in conjunction with the accompanying drawing, in which:

FIG. 1 is a view of a portion of a battery of coke ovens according to the invention, shown in cross section; and

FIG. 2 is a cross-sectional view, taken on line II—II of FIG. 1.

The coke-oven battery is provided with chambers **1** (FIG. 1) loaded with a charge **2**. Disposed on both sides of the chambers **1** are firing hollow members **3**, comprising vertical firing channels **5** divided by partition walls **4** (FIG. 2); the combustion of fuel gas supplied together with air through devices **6** occurs in said vertical firing channels.

A peep channel **7** extends into each vertical channel **5**, while the chambers **1** are provided with charging doors **8**.

Provided on the division partition walls **4**, as is shown in FIGS. 1 and 2, are projections **9**, **9¹** made of the same material as the refractor lining of the firing hollow members **3** and the partition walls **4**.

The projections **9** and **9¹** are arranged throughout the height of the partition walls **4** according to a staggered order so that they enable observing these projections **9** and **9¹** through the peep channels **7**.

The description of the method for controlling the readiness of the coke mass will be given hereafter for use in the above-mentioned coke-oven battery.

The charge **2** loaded into the chambers **1** is coked by virtue of heat obtained by the combustion of gas in the firing channels **5**.

Introduced into the charge **2** to be coked through the charging doors **8** are thermocouples intended for measuring temperature along the axis of the coke mass, for instance, at points A and B, at various levels throughout the height and length of the chamber **1**. The number of the points where the temperature is to be measured, is established as required. The measurement of temperatures at the points A and B of the coke mass is necessary only for establishing its initial temperature during the coking process.

Simultaneously, with measurements of temperature of the coke mass, the temperature of the refractory lining of the partition walls **4** is determined by means of an optical pyrometer evaluating the luminosity of the projections **9** and 9^1 which are arranged at the same levels as the measurement points A and B in the coke mass. These measurements enable obtaining, at each level at a specified period of the coking process, corresponding differences of temperatures between the refractory lining and the coke mass.

The difference of temperatures thus obtained is further employed for evaluating the temperature of the coke mass in the coking process when using only the temperature measurement values of the projections **9** and 9^1 in the refractory lining of the partition walls **4** of the firing hollow members **3**.

The method for controlling the readiness of the coke mass in the chamber **1** of the coke oven thus described will be made more fully apparent from a consideration of the following description of an exemplary embodiment thereof.

EXAMPLE

Let us designate temperatures, measured along the axis of the coke mass by the aid of thermocouples:

at the point A—tx,
at the point B—t_y.

The temperatures of the projections of the partition walls of the firing hollow members, as measured by the optical pyrometer at the same time, will be designated:

projection **9**—t_x^1,
projection 9^1—t_y^1.

The established difference of temperatures (Δt_1, Δt_2) for the point A and projection 9^1 it will be equal to $\Delta t_1 = tx_1 - tx$; while for the point B and projection **9** it will be equal to $\Delta t_2 = ty' - ty$.

In the specified period of the coking process, the temperature to be determined at the point A of the coke mass will be designated t_A; at the point B, t_B; the temperature of the projection **9** will be designated t_9, and that of projection 9^1, respectively t_9^1.

The temperature of the coke mass to be determined will be equal:

at the point A: $t_A = t_9 - \Delta t_1$,
at the point B: $t_B = t_9^1 - \Delta t_2$.

The present invention enables controlling the readiness of the coke mass to be directly carried out during the coking process.

What is claimed is:

1. A method for controlling the readiness of a coke mass in chambers of horizontal coke ovens, wherein first the temperature of the coke mass is measured at various levels throughout the height and length of said coking chambers followed by measuring at the same levels the temperature of the firebrick lining of dividing partition walls between the firing channels of hollow members disposed on both sides of said coking chambers, and a temperature difference is established for each of said levels between the firebrick lining of said partition walls and the coke mass; after the temperature difference between the firebrick lining and coke mass has been determined, only the temperature of the firebrick lining of said partition walls and coke mass is measured at the same levels, and the temperature of the coke mass between the firebrick lining of the partition walls and coke mass is determined taking into account the established temperature difference between the firebrick lining of said partition wall and the coke mass.

2. A method for controlling the readiness of a coke mass according to claim **1**, wherein the temperature of said firebrick lining is measured by the luminosity of projections made of the same material as the firebrick lining of the firing hollow member, said projections being arranged according to a staggered order throughout the height of said dividing partition walls and observed through peep channels opening into the firing channels of said hollow members.

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