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METHOD FOR MAKING ARTIFICIAL CARBON
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5 Claims. (Cl. 18—47.5)

1 Artificial carbon pieces are made for different purposes, for instance for electrodes of arc furnaces, for the sole of electrometallurgical furnaces and so on. The method consists essentially in mixing a carbonaceous raw material with a binder and baking the mass at high temperature, eventually after pressing. One mixes for instance ground coke with a pitchy binder (for instance coal tar), presses and then bakes it for instance during several hours up to a temperature of say 1500° C. The pressing of the mass is done suitably in the heat, say at 60–140° C. When the making of carbon electrodes is in question one uses advantageously an extrusion press.

Artificial carbon pieces made by pressing are superior to artificial carbon pieces obtained by ramming or casting in molds the mass made sufficiently plastic by using a material of suitable size and adding a suitable quantity of binder. They are much denser, have a better electric conductivity and are less subjected to oxidation.

Thorough investigations carried out by the applicant on an industrial scale have shown that artificial carbon pieces made by casting can be considerably improved by subjecting the pasty or fluid mass to mechanical vibrations of high frequency. The frequency should amount to several thousand vibrations of an amplitude as large as possible, for instance of 0.25 cm., per minute. At 6000 vibrations per minute for instance the favourable effect can be noticed; however, it is better to work at 10,000 vibrations and more.

One produces the vibrations in the artificial carbon mass most suitably by immersing a vibrator into the mass. This is a device by means of which vibrations of high frequency can be communicated to the surrounding medium. Such devices are used for instance in the making of high-grade concrete. It is also possible to communicate the vibrations from the outside.

The artificial carbon mass to be treated becomes suitably heated, for instance up to 140–200° C., before being subjected to the mechanical vibrations. The fact that the mass becomes more fluid and shrinks shows the effect of the vibrations.

The artificial carbon pieces of suitable composition which are obtained by baking the mass which has been subjected to the vibrations show a much better density (lower porosity), a better mechanical strength and a better durability than the artificial carbon pieces obtained without vibrations by casting the mass according to known methods; the electric conductivity is also better.

2 It was surprisingly noticed that less binder is needed if the mass is subjected to vibrations.

In comparison with the pressing of the artificial carbon pieces the casting method presents the great advantage that one is not tied to any size or form. It is for instance possible to make the sole of aluminum producing furnaces by assembling a relatively small number of moulded artificial carbon blocks; it is thereby possible to make a part of the wall with a corresponding section of the furnace sole in one piece. Up to the present time such bottoms of aluminum production furnaces were made principally by ramming a suitable mass, which becomes baked after the starting of the furnace, or by assembling pressed artificial carbon blocks. Artificial carbon blocks made by casting were not successfully used up to now because of their insufficient durability and their high porosity.

20 The casting of a large artificial carbon block according to the present invention is carried out suitably in the following manner:

One pours at first the pasty mass into the mold up to a height of 20–50 cm., then introduces the vibrating device into the mass and fills the mold up to the desired height, and raising the vibrating device by degrees. As this motion is a relative one, the vibrating device can naturally remain at the same height, the mold being lowered with the same speed as it becomes filled; it is also possible to raise the vibrating device and lower the mold simultaneously.

The invention can also be applied to continuous self-baking electrodes such as are used in 35 Söderberg furnaces or to the bottoms of certain re-melting furnaces. With continuous self-baking electrodes one pours the pasty electrode mass into a metal shell, the mass becoming baked in the neighbourhood of the furnace sole because of the high heat. The transition from the filling zone to the baking zone takes place by degrees. It is indeed also advantageous to subject the mass while still pasty to mechanical vibrations of high frequency according to the present invention.

40 Instead of subjecting the carbonaceous mixture to mechanical vibrations after the pouring into the mold or into the electrode shell, one can carry out this treatment before the pouring, for instance in a ladle. But it is generally easier to undertake a uniform vibration treatment in the mold itself.

I claim:

1. A method for making artificial carbon pieces by casting, comprising subjecting a coherent, 55 pasty mixture of carbon and binder to mechanical

3

vibrations of a frequency of at least 6000 per minute and then baking the pieces.

2. A method for making artificial carbon pieces by casting, comprising subjecting a coherent, pasty mixture of carbon and binder to mechanical vibrations of a frequency of about 10,000 per minute and an amplitude of the magnitude of 0.25 cm. and then baking the pieces.

3. A method for making artificial carbon pieces by casting, comprising internally applying to a coherent, pasty mixture of carbon and binder mechanical vibrations of a frequency of at least 6000 per minute and then baking the mixture.

4

4. A method for making artificial carbon pieces by casting, comprising forming a coherent, pasty mixture of carbon and binder into bodies of desired shape, subjecting the formed bodies to mechanical vibrations of a frequency of at least 6000 per minute, and then baking the formed bodies.

5. A method for making artificial carbon electrodes by casting, comprising casting an electrode mass into a desired electrode shape and subjecting the formed electrodes to mechanical vibrations of a frequency of at least 6000 per minute.

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