No. 860,477. PATENTED JULY 16, 1907.

W. H. HUFFMAN.

METHOD OF AND MEANS FOR CHARGING ELECTRIC FURNACES.

APPLICATION FILED FEB. 15, 1907.

Fig. 1.

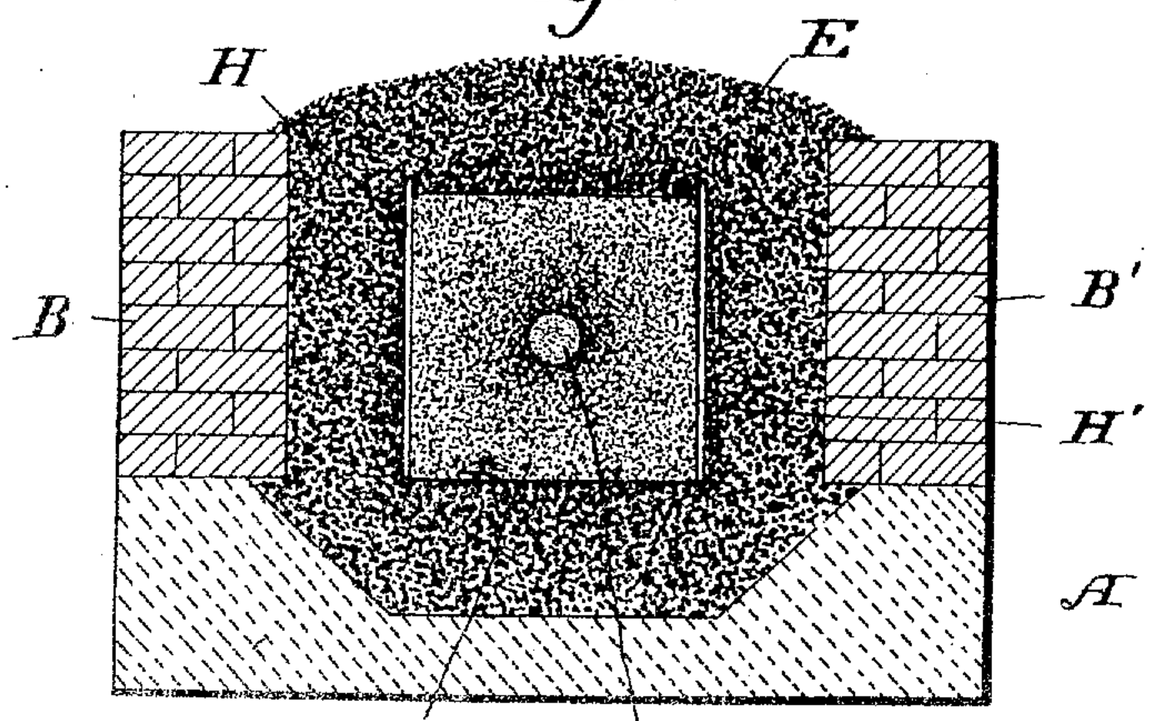


Fig. 2.

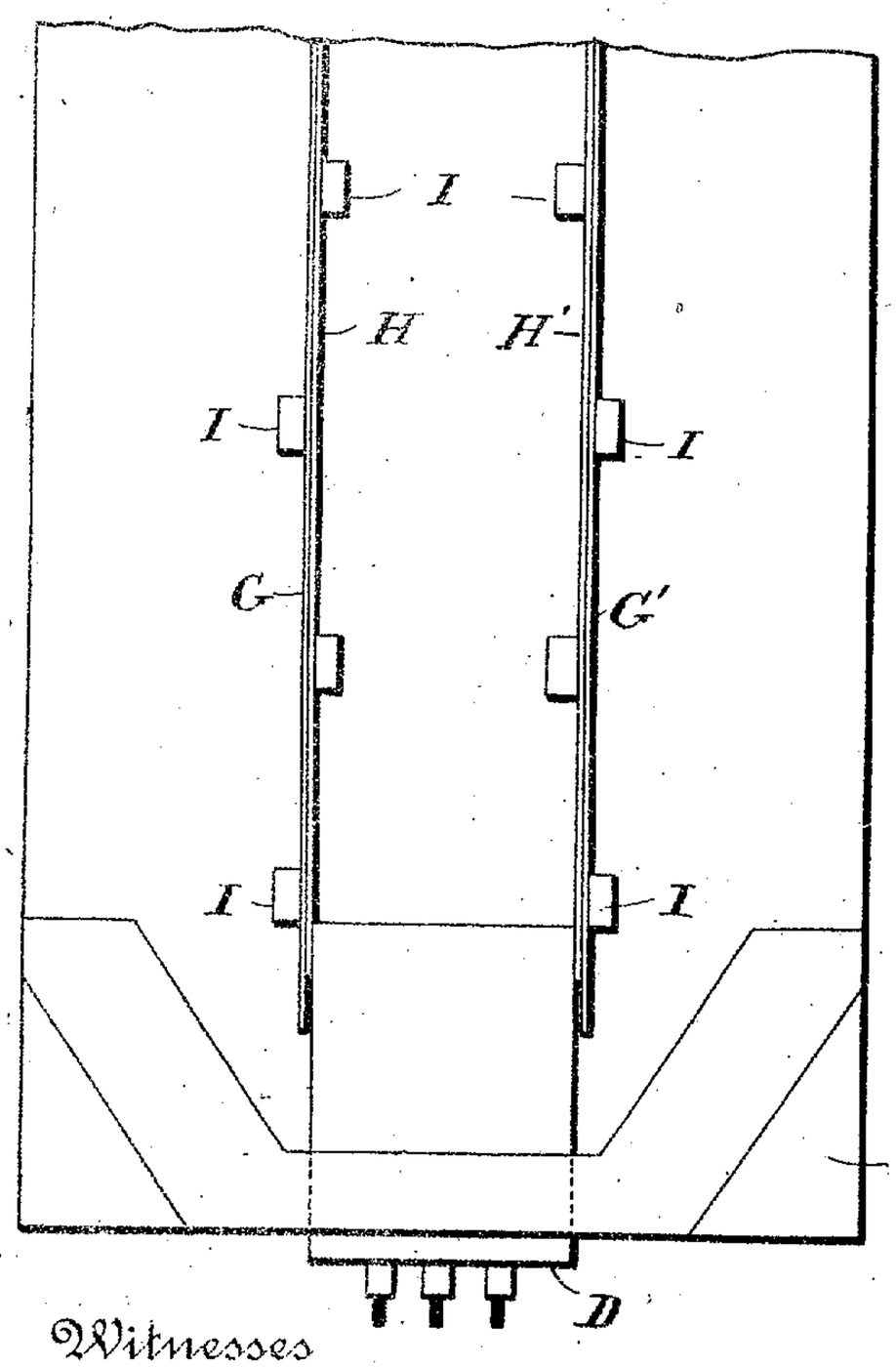
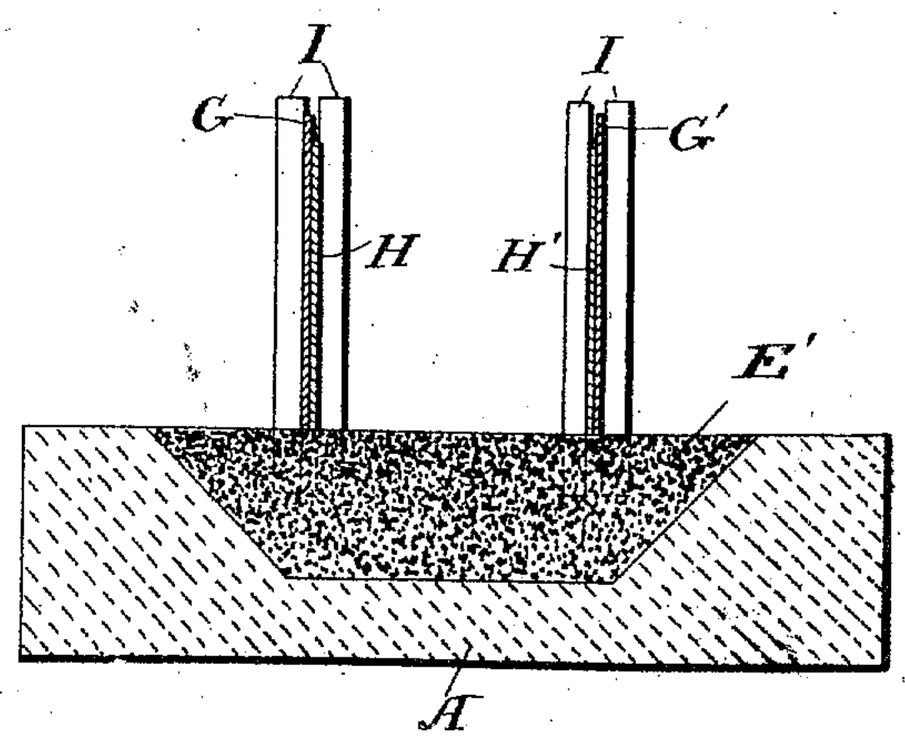


Fig. 3.



Witnesses

J. G. Stinkel

J. J. McCarthy

Inventor

W. H. Huffman

by Foster Freeman Watson

Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM H. HUFFMAN, OF NIAGARA FALLS, NEW YORK, ASSIGNOR TO INTERNATIONAL ACHESON GRAPHITE COMPANY, OF NIAGARA FALLS, NEW YORK, A CORPORATION OF NEW JERSEY.

METHOD OF AND MEANS FOR CHARGING ELECTRIC FURNACES.

No. 860,477. Specification of Letters Patent. Patented July 16, 1907.

Application filed February 15, 1907. Serial No. 357,565.

To all whom it may concern:

Be it known that I, WILLIAM H. HUFFMAN, a citizen of the United States, and residing at Niagara Falls, Niagara county, New York, have invented certain new and useful Improvements in Methods of and Means for Charging Electric Furnaces, of which the following is a specification.

My invention relates to a method of and means for charging electric furnaces and has for its object to provide a new and useful means and method whereby electric furnaces may be quickly and effectively charged, and the unloading of the furnaces is facilitated, and to these ends my invention consists in the various features of construction and mode of operation substantially as hereinafter more particularly set forth.

Referring to the drawings wherein I have illustrated the means whereby the method of charging furnaces is carried out—Figure 1 is a transverse cross section of a charged or loaded electric furnace embodying my invention; Fig. 2 is a plan view of the same; and Fig. 3 is a detailed view indicating the relative positions of the different parts during one period of charging the furnace.

In the manufacture of graphite, siloxicon and materials similarly manufactured by use of an electric furnace of the Acheson type, there has been some difficulty in properly and effectively charging the furnace so that the raw material or material to be treated can be properly separated from the surrounding or embedding material, so that the heat of electric current can be thoroughly distributed throughout the mass of the material to be treated and be utilized in the most effective manner, and so that at the end of the operation there shall be a clear plane of demarcation between the converted material and the surrounding or embedding material, whereby the unloading of the furnace is facilitated. It is well known that in furnaces of this general type electric currents of high volume are used and a large amount of material is treated at each run of the furnace. The current is passed through the raw material or material to be treated or to be converted into graphite or other desired product, and the heat of the current is transmitted and radiates or penetrates more or less into the surrounding or embedding material where it is less effective in producing the results desired. It is desirable that this heat should be concentrated as far as possible, so as to act mainly upon the raw material to be treated or converted, and not be expended in heating the embedding material. It is also desirable that there should be a clear plane of demarcation between the material treated or converted and the surrounding or embedding material, as this greatly facilitates the unloading of the furnace and separation of the treated or converted material from the surrounding or embedding material. It is to aid and accomplish these and other results, so that the furnace may be used in the most economical way and very perfect results be produced, that my invention is made.

While, of course, the general features of my invention may be used in many and various furnaces, and in different ways, varying according to the type of furnace and results desired, I have illustrated it as used in connection with a graphite making electric furnace of the Acheson type.

Referring to the drawings, the furnace comprises a bed A which is of some heat resisting material, as brick, concrete, and the like, and mounted upon the longitudinal edges of this base are the outer walls B B′, and these may be made of fire brick or other material, and one or more of them is usually a temporary structure capable of easily being withdrawn or removed when the furnace is to be emptied or discharged. The ends C of the furnace are usually of a more permanent character and of fire resisting material, and serve to support electrodes D.

In charging the furnace, it is usual to first supply a quantity of the surrounding or embedding material or mixture E, and in Fig. 3 at E′ I have indicated the first step in charging the furnace with the embedding mixture. The material marked E′ in Fig. 3 is a part of the embedding mixture E and is the same in kind as the balance and I have used this separate reference letter simply for convenience in describing the part of the mixture which is placed in the furnace before the material to be treated and the separating walls are added. The material F to be treated should occupy a greater or less extent of the longitudinal central portion of the furnace extending between the electrodes at the two ends, and the size of this body of raw material depends of course upon its nature, the strength of the electric current and other considerations. Difficulty has arisen however in properly and accurately disposing of this raw material in the center of the mass of surrounding material and in relation to the electrodes, and especially has it been difficult to provide a clear plane of demarcation between the two materials, and efforts have been made with greater or less success to accomplish this purpose.

With my improved method and means I provide longitudinal walls extending preferably throughout the length of the furnace between the electrodes and these walls are so placed as to form a channel or receptacle for the material being treated. Thus in the drawing I have shown these longitudinal walls of the furnace comprising rigid plates G G′ of sheet iron, wood, or other rigid material, inside or outside of which are

placed plates H H′ of material more or less flexible, such as paper, or other flexible material. These walls may be supported temporarily or otherwise in any suitable way, and I have shown a number of stakes I, the ends of which are embedded in the mass E′ of the surrounding or embedding material, and these stakes or supports tend to maintain the longitudinal walls in position, while the furnace is being further charged. These stakes or supports may be of different material, such, for instance, as wood, and may be removed after accomplishing the purposes, or may be allowed to remain in the furnace during the operation thereof, although preferably they are removed. So too, the rigid walls or plates G are preferably removed after the furnace is charged, and while the flexible walls may also be removed, I find it preferable to allow them to remain during the run of the furnace, even though they be consumed or destroyed by the heat of the furnace. Having thus arranged these internal longitudinal walls of the furnace, the raw material F to be converted can readily be filled into the channel between the walls and the surrounding or embedding material E can be placed around the outside of the walls. The rigid walls, flexible walls, and stakes, any or all, can then be withdrawn if desired, and the material to be treated be covered with a portion of the surrounding material E. In this way I am enabled to provide a clear plane of demarcation between the raw material being treated and the surrounding or embedding material. Sometimes it is desirable to provide a core J of a material of relatively high conductivity extending between the electrodes D and through the longitudinal center of the mass of raw material, and by the use of my invention this can readily be accomplished and this so-called conducting core can be located in proper relation to the other parts of the charge.

I have shown the walls as being straight and forming a rectangular channel for the reception of the raw material, but the shape of these walls can be varied so long as they accomplish the main purposes thereof, as in forming a clear plane of demarcation between the various material of the furnace and regulating the size of the mass of raw material in accordance with the current used, so that the heat produced thereby shall be most effectively utilized. Not only is it advantageous to have this plane of demarcation in charging the furnace, but it is also of advantage in discharging the furnace, so that when, after the run, the surrounding or embedding material is removed, to a greater or less extent in unloading the furnace, the converted material will be found in a clearly defined mass readily separable from the embedding material.

In the illustration I have only shown the use of side walls, but it will readily be understood that a top and even a bottom wall may be used when desired, although in practice I find that these are not as essential as are the side walls in accomplishing the purposes of my invention.

What I claim is:

1. The method substantially as hereinbefore described of charging electric furnaces, which consists in depositing the raw material to be treated between flexible and rigid walls, surrounding the raw material and walls with a mixture having a relatively low conductive capacity, and withdrawing the rigid walls.

2. The method substantially as hereinbefore described of charging electric furnaces, which consists in depositing the raw material to be treated between flexible and rigid walls, surrounding the raw material and walls with a mixture having a relatively low conductive capacity, and withdrawing the flexible and rigid walls.

3. As a means for charging electric furnaces, flexible and rigid walls separating the raw material to be treated from the surrounding embedding mixture.

4. As a means for charging electric furnaces, flexible and rigid walls forming a receptacle and separating the raw material to be treated from the surrounding and embedding mixture, and means for temporarily supporting the walls.

5. As a means for charging electric furnaces, separating walls composed of paper and metal sheets or plates forming a receptacle for the raw material to be treated and separating it from the surrounding embedding mixture.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. HUFFMAN.

Witnesses:
W. A. Smith,
Frank N. Coe.