No. 656,156. Patented Aug. 14, 1900.

W. S. HORRY.

METHOD OF PRODUCING CARBID OF CALCIUM, &c.

(Application filed Mar. 4, 1899. Renewed Jan. 15, 1900.)

(No Model.)

Fig. 2.

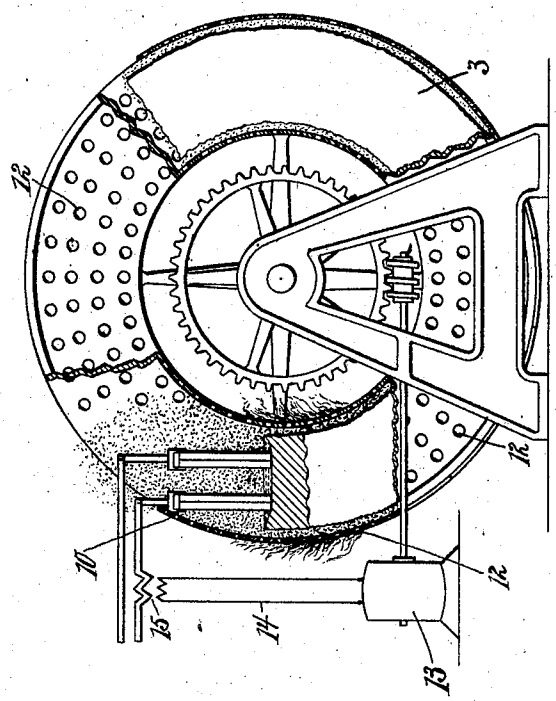
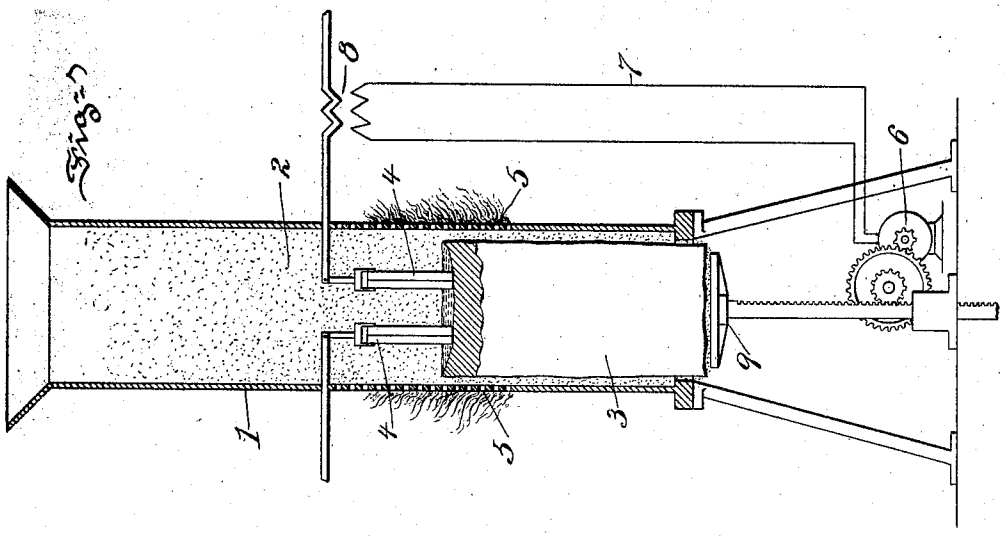


Fig. 1.



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UNITED STATES PATENT OFFICE.

WILLIAM SMITH HORRY, OF NEW YORK, N. Y.

METHOL OF PRODUCING CARBID OF CALCIUM, &c.

SPECIFICATION forming part of Letters Patent No. 656,156, dated August 14, 1900.

Application filed March 4, 1899. Renewed January 15, 1900. Serial No. 1,544. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM SMITH HORRY, a subject of Her Majesty the Queen of Great Britain, residing at the city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in the Production of Carbid of Calcium and the Like, of which the following is a specification.

This invention constitutes a progressive improvement on my other inventions relating to electric furnaces and electrical methods of making carbid of calcium and other substances, for which I have obtained Letters Patent of the United States No. 597,880 and have made application for Letters Patent, which application is serially numbered 673,133.

The leading features of my present invention are, first, the automatic production of carbid of calcium in such manner that when once started and the bin, hopper, or space for raw material filled the process or production will continue without further attention as long as material is left in the bin or hopper and the carbons remain intact, and, second, dustlessness and cleanliness in operation, which are very advantageous and important.

The methods now practiced are automatic in so far as the regulation of the furnace-current is concerned, as is set forth in my said application, but are not automatic in respect to the stoking of the furnace. In practice the stoking is done either entirely by hand, as coal is fired under a boiler, or by regulating a valve or the like fitted to a bin or other supply of raw material placed above the furnace, so that a continuously-running furnace requires in practice continual attention.

By the use of my invention the operation of the furnace is made entirely automatic and requires attention only at long intervals—for example, once a day, when the bin requires refilling, and once a week or so, when the carbons have to be renewed.

The manufacture of the carbid as now practiced is exceedingly objectionable and when carried on extensively, as at Niagara Falls, is obnoxious to every living thing and very deleterious to bearings and other parts of moving machinery. The ground and trees are covered with a gray deposit which extends thousands of yards from the furnaces, and it has a choking effect upon the attendants in charge of the furnaces. This is occasioned by the gases from the furnace squirting out the finely-ground material and filling the surrounding atmosphere with dust composed of carbon and quicklime. By my invention the only substance given off from the furnaces is a clean gas—carbon monoxid—which burns to carbon dioxid, and the operation therefore causes no dust at all.

Stated in general terms, my invention comprises a dustless method of making carbid and the like, which consists in maintaining a field of reduction at the top of the finished product and beneath depending carbons, around and above which an incoming charge gravitates, whereby a lateral path of least resistance is provided by which the evolved gases escape beneath the electrodes and mass of the charge, and it further comprises the improvements hereinafter set forth.

The nature, characteristic features, and scope of the invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, and in which—

Figure 1 is a sectional view of one type of electric furnace to which my invention is applicable, and Fig. 2 is a similar view of another type of electric furnace to which the invention is applicable.

To practice my invention, I provide a furnace-body or the like adapted to contain and receive at its top a supply of charge and to permit of the removal or withdrawal of the finished product from beneath the charge. I also provide electrodes depending from and through the charge. The advantage of this is that I am enabled to control automatically the removal of the product and regulate the furnace-current, as set forth in my said application, Serial No. 706,352, and also to cause the charge to feed by gravitation, to protect the electrodes, and to present such opposition to the passage of the gases evolved that the same seek a path or paths of least resistance and escape laterally from beneath the electrodes and incoming charge and from above the finished product, whereby dust is pre-

vented and automatic stoking accomplished. As an appropriate provision for the attainment of this result I provide foraminous side walls in the furnace-body at and near the zone of reduction and heat, through which the gases may escape laterally without squirting out the powdered material or deleteriously affecting the electrodes.

In Fig. 1, 1 is a furnace-body that may communicate at its top with or form the spout of a hopper or bin containing a supply of powdered raw material. This body is adapted to contain the raw material 2 at its top and the finished product 3 below. The electrodes 4 depend within the body and are substantially parallel and vertical. The side walls of the body at and near the zone of reduction are foraminous, as at 5, for the lateral escape of the evolved gases.

6 is a motor controlled by the furnace-circuit 7—as, for example, by way of a transformer 8—and adapted to shift the furnace-bottom 9.

In Fig. 2 the upper portion 10 of the circular furnace is built up above and around the depending electrodes 4 to contain a supply of raw material, and it may communicate with a spout or itself form a bin or hopper, as shown. The lower portion of the furnace receives and by its rotation serves to shift the product. The side walls of the furnace are foraminous, as as 12, for the purpose described.

13 is a motor geared to the rotary furnace and controlled by the furnace-circuit 14, for example, as by a transformer 15.

In use powdered raw material is piled up so high in the bin or hopper and upper part of the furnace that gas given off during the formation of the product will not violently escape through the top, which would produce or create dust, but will leave the furnace by the vents, holes, or foraminous side walls surrounding the arc or heat zone in a lateral direction with respect to the carbid, electrodes, and charge, and thus produce no dust. The product is removed from time to time, and as produced it lowers the electrical resistance between the electrodes and the current (amperes) consequently increases. When this occurs, the series transformer causes a large current to traverse the motor, which then rotates in such direction that the carbid is drawn away from the arc, and the furnace-amperes are thereby reduced and the motor slows down and stops. A more full description of the electromechanical apparatus by which the electric energy is automatically kept constant in electric furnaces is contained in my said application, to which reference may be had. The effect of withdrawing the carbid from the zone of reduction is to permit fresh raw material to sink by gravity into that zone, and this process will automatically continue as long as there is any raw material left in the bin or hopper. The carbon monoxid issues laterally from the heated zone and ignites generally spontaneously and burns to carbon binoxid.

It will be obvious to those skilled in the art to which my invention appertains that modifications may be made in details without departing from the spirit thereof. Hence I do not limit myself to the precise construction and arrangement of parts hereinabove set forth, and illustrated in the accompanying drawings; but,

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The dustless method of making carbid of calcium and the like which comprises arranging electrodes of opposite polarity in a substantially-vertical position and electrically maintaining a zone of reduction near their depending ends, feeding a charge around and between and above the electrodes to a depth sufficient to oppose the passage through it of the evolved gases and supporting the product beneath the charge and electrodes and thereby forming a lateral path of least resistance from the heat zone, conducting away the evolved gases laterally by said path, and shifting the carbid and charge vertically in respect to the electrodes to bring successive portions of the charge into the zone of reduction, substantially as described.

2. The method of automatically making carbid of calcium and the like which consists in arranging electrodes in a substantially-vertical position and electrically maintaining a zone of reduction near their depending ends, superimposing a charge above the electrodes to a depth sufficient to oppose the passage of evolved gas and permitting it to gravitate between and around the electrodes, supporting the product beneath the charge and electrodes, conducting the evolved gases away laterally from the zone of reduction, and shifting the carbid vertically in respect to the electrodes to permit successive portions of the charge to gravitate into the zone of reduction, substantially as described.

3. The method of automatically making carbid of calcium and the like which consists in arranging electrodes in a substantially-vertical position and passing a current between them to maintain a zone of reduction near their depending ends, superimposing a charge above the electrodes to a depth sufficient to oppose the passage of evolved gas and permitting it to gravitate between and around the electrodes, automatically shifting the product to keep said current constant, and conducting the evolved gases away laterally from the zone of reduction, substantially as described.

In testimony whereof I have hereunto signed my name.

WILLIAM SMITH HORRY.

In presence of—
J. E. McLAUGHLIN,
H. S. DUDLEY.