No. 700,808. Patented May 27, 1902.

W. R. PARKS.

ELECTRIC FURNACE.

(Application filed July 22, 1901.)

(No Model.)

Fig. 1.

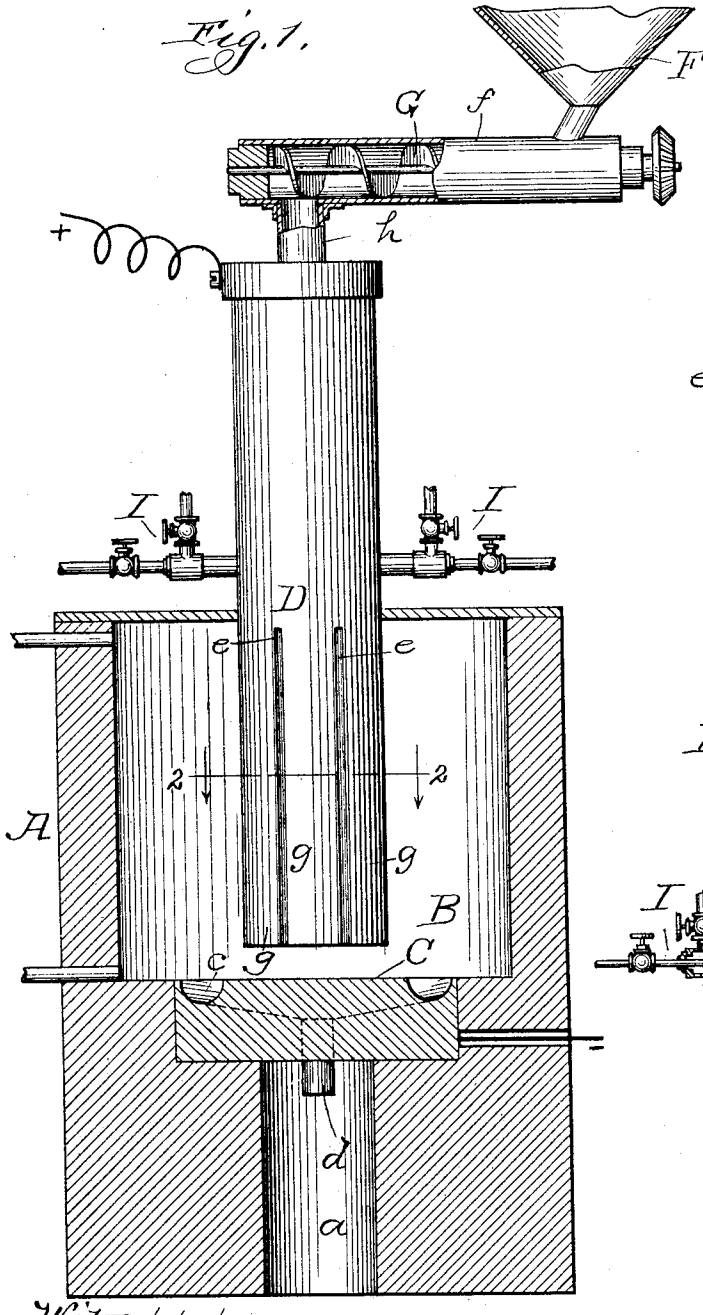


Fig. 2.

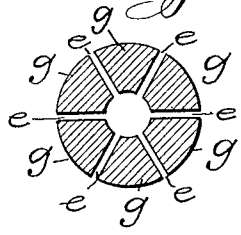
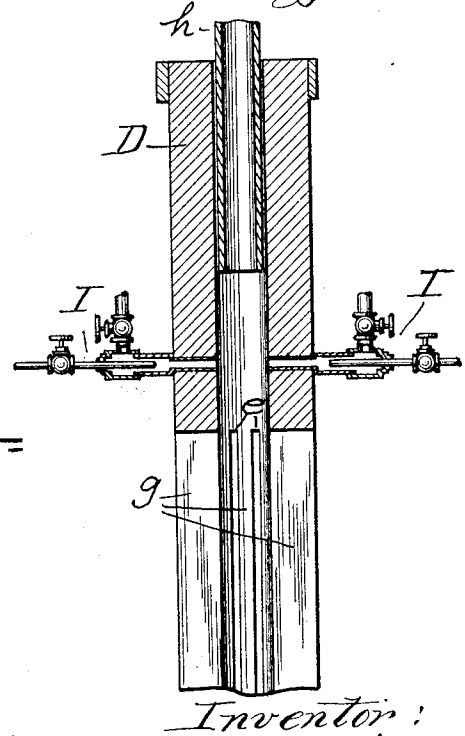


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM R. PARKS, OF CHICAGO, ILLINOIS.

ELECTRIC FURNACE.

SPECIFICATION forming part of Letters Patent No. 700,808, dated May 27, 1902.

Application filed July 22, 1901. Serial No. 69,235. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. PARKS, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric Furnaces, of which the following is a full, clear, and exact specification.

My invention relates to the class of electric furnaces devoted to the manufacture of calcic carbids and for any other purpose in which a very uniform high degree of heat is desired.

The object of my invention is to combine the work of specially-constructed electrodes with hydrocarbon or other gas utilizing heat-generating apparatus so as to obtain by their combined action the greatest heat possible consistent with the greatest practical economy. This I accomplish by the means hereinafter fully described and as particularly pointed out in the claims.

In the drawings, Figure 1 is a vertical central section of an electric furnace, showing part of my invention in section and part thereof in front elevation. Fig. 2 is a horizontal section of the upper or positive electrode, taken on dotted line 2 2, Fig. 1. Fig. 3 is a vertical central section of said upper electrode with its lower end broken away.

The furnace A in which I prefer to use my improvements consists of a structure the base or sides of which are made of brick. The base of this furnace is made very thick, and centrally below its combustion-chamber B it is provided with a tunnel *a*, that leads from a point under the negative or lower electrode C of my invention to the outside. The lower electrode C consists of a square or other suitable shaped slab of carbon or other suitable material, which is preferably set into the floor in the combustion-chamber under its upper surface and on the same plane thereas. In its upper surface a circular or other-shaped gutter *c* is made, which is adapted to drain off the liquefied or molten products of the furnace, which would otherwise collect therein while the furnace is in practical operation, into a drain or discharge pipe *d*, that extends down from the lowest point in said gutter down through the electrode into the tunnel *a*, where any suitable receptacle is placed to catch the same.

I do not wish to be confined to a lower electrode constructed as above described, because it is obvious that the gutter could be made to describe other than a circular course and more than one drain-pipe could be used in conjunction therewith without departing from the spirit of my invention. Now the top of the furnace is covered by a suitable metallic part, the margins of which rest upon the side walls of the furnace; but I do not wish to be confined to such a roof or cover for the combustion-chamber of this furnace, as it is evident other constructions may be adapted for this purpose.

Extending centrally down through a suitable opening in the roof or cover of the furnace is a longitudinally-adjustable vertical tubular positive electrode D, which is adjustably supported in any suitable manner so as to bring its lower terminal within operative distance of the lower electrode. It will be observed that the lower electrode is suitably connected to the negative (—) wire of an electric circuit, and the upper end of the upper electrode is connected to the positive (+) wire of the same. In order to facilitate the connecting of the positive wire thereto, the upper terminal of this upper electrode is shown as having a metal band secured to it. Any practical method of doing this, however, would be satisfactory.

The lower portion of the upper electrode D, coming within the combustion-chamber B of the furnace, is divided by corresponding longitudinal slits *e*, preferably located at equal distances apart, into a series of positive poles *g g*, so that when said upper electrode is properly adjusted and the current turned on an arc will be formed between the terminals of each of these poles and the adjacent surface of the negative pole C within the circumference of the circular gutter, (when that form of gutter is employed,) substantially as shown in Figs. 1 and 4 of the drawings.

In order to supply the materials to be treated to the space between the upper and lower electrodes, I have provided a suitable hopper F, from which the said materials gravitate

into a horizontally-disposed conduit *f*, where by means of a suitably-revolved spiral conveyer G they are mixed and conveyed to a vertical feed-pipe *h*, which depends down into the bore of the upper portion of the upper electrode without affecting the adjustability thereof. The material feeds through this pipe *h* and gravitates onto the lower electrode and between the same and the lower terminal of said upper electrode, as shown. In operation the material so fed to these electrodes is soon heated to a very high degree by the number of arcs formed between the same and melted, and this melted product flows into the gutter *c* of said lower electrode and is conveyed thereby to the drain-pipe *d*, which carries the same into such receptacle as may be placed in the tunnel to collect this molten product. At a point just above the top of the furnace the walls of said electrode are pierced by the jets of suitably-constructed injectors *l l* of a hydrocarbon or other gas generator. These injectors are preferably arranged transverse to the axis of the electrode D in diametrically opposite or opposed positions, so that when the gas is injected into the bore of the upper electrode and ignited the flames will converge toward the center of said electrode and there create an intense heat, through which the materials discharged into the electrode through feed-pipe *h* must pass. As the material supplied to the electrode will soon rise in the bore thereof to a point above the locations of these injectors after the furnace is once gotten into operation, said materials in transit past said injectors become very highly heated, and in such condition are more easily and rapidly reduced to a molten state between the electrodes.

What I claim as new is—

1. In an electric furnace the combination with a tubular positive electrode and gas-burning devices extending through the walls of said electrode mediate its ends, of a suitable negative electrode.

2. In a furnace the combination with a tubular positive electrode having several terminals at its arcing end, and gas-burning devices extending through the walls of said electrode mediate its ends, of a suitable negative electrode.

3. In an electric furnace the combination with a tubular positive electrode, and gas-burning devices inserted through the walls and entering the bore of the same, mediate its ends, of a negative electrode, and a drain therethrough for carrying off the molten products of the furnace.

4. In a furnace the combination with a tubular positive electrode, and gas-burning devices inserted through the walls and into the bore of the same mediate its ends, of a negative electrode having a gutter in its upper surface and a drain leading from said gutter.

5. In a furnace the combination with a tubular positive electrode, and gas-burning devices inserted through the walls and into the bore of the same mediate its ends, of a negative electrode having a circular gutter concentric but greater in diameter than said positive electrode, and having a drain leading from said gutter.

6. In a furnace the combination with a tubular positive electrode having several terminals at its arcing end, and gas-burning devices inserted through the walls of and into the bore of the same, of a negative electrode having a drain therethrough.

7. In a furnace the combination with a tubular positive electrode having several terminals at its arcing end, and gas-burning devices inserted through the walls of and into the bore of the same, of a negative electrode having a gutter in its upper surface, and a drain leading from said gutter.

8. In a furnace the combination with a tubular positive electrode having several terminals at its arcing end, and gas-burning devices inserted through the walls of and into the bore of the same, of a negative electrode having a circular gutter and its upper surface concentric to but greater in diameter than said positive electrode.

9. In a furnace the combination with a longitudinally-adjustable tubular positive electrode having several terminals at its arcing end, and gas-burning devices inserted through the walls of and into the bore of the same, of a negative electrode having a drain therethrough.

10. In a furnace the combination with a longitudinally-adjustable tubular positive electrode having several terminals at its arcing end, and gas-burning devices inserted through the walls of and into the bore of the same, of a negative electrode having a gutter in its upper surfaces, and a drain leading from said gutter.

11. In a furnace the combination with a longitudinally-adjustable tubular positive electrode having several terminals at its end, and gas-burning devices inserted through the walls of and into the bore of the same, of a negative electrode having a circular gutter and its upper surface concentric to but greater in diameter than said positive electrode.

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