

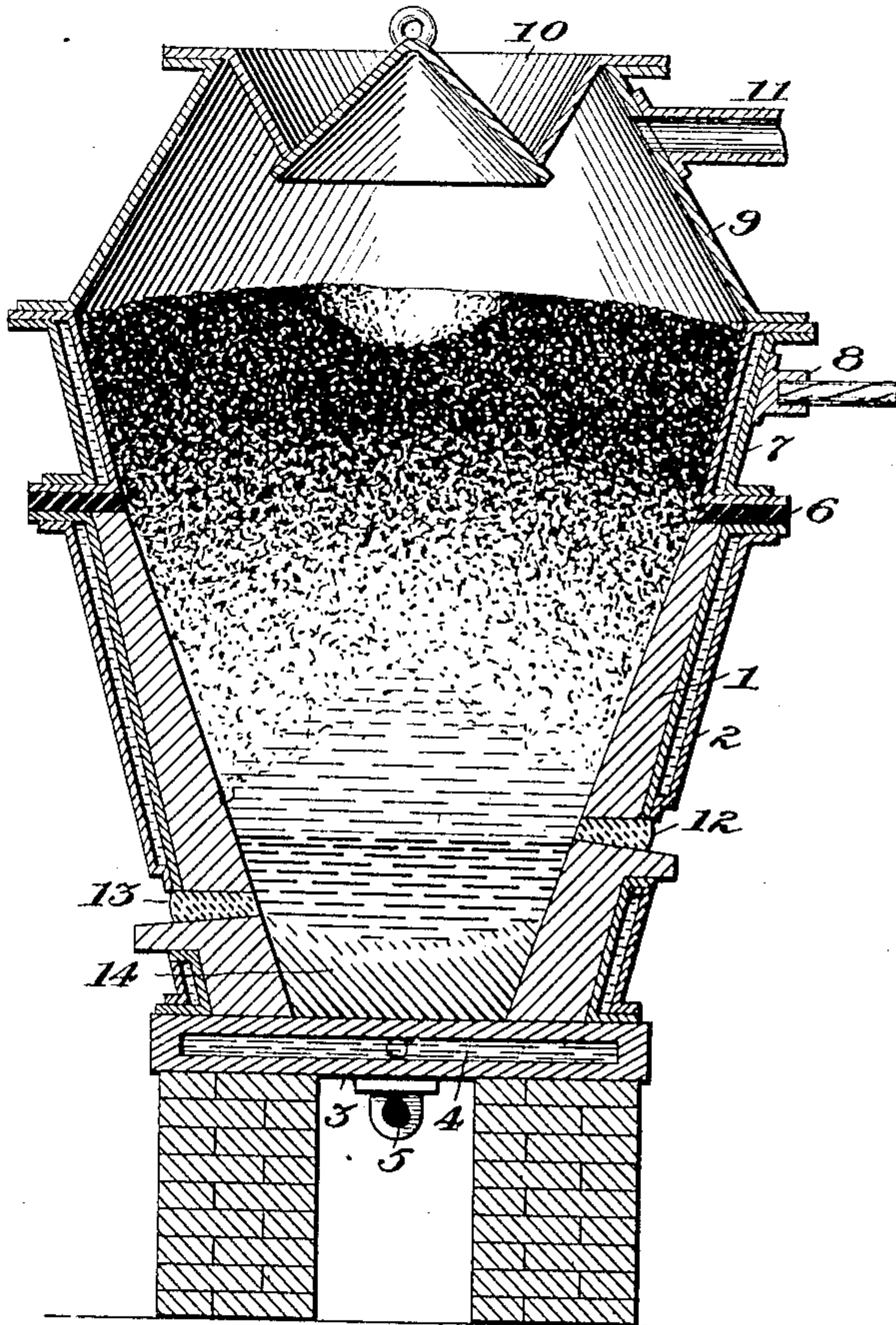
No. 882,417.

PATENTED MAR. 17, 1908.

E. F. PRICE.

PROCESS OF PRODUCING FERROSILICON.

APPLICATION FILED NOV. 14, 1905.



Witnesses:
Ed. E. Clauette
J. B. Hill

Inventor:
Edgar F. Price,
by Cymes, Tourneau,
Att'ys.

UNITED STATES PATENT OFFICE.

EDGAR F. PRICE, OF NIAGARA FALLS, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
CENTRAL TRUST COMPANY OF NEW YORK, A CORPORATION OF NEW YORK, TRUSTEE
UNDER FIRST MORTGAGE.

PROCESS OF PRODUCING FERROSILICON.

No. 882,417.

Specification of Letters Patent.

Patented March 17, 1908.

Application filed November 14, 1905. Serial No. 287,348.

To all whom it may concern:

Be it known that I, EDGAR F. PRICE, a citizen of the United States, residing at Niagara Falls, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Processes of Producing Ferrosilicon, of which the following is a specification.

According to the present process, a charge containing a silicon compound, carbon and a source of iron, is smelted by means of an electrically-heated resistance-conductor. The product is tapped out of the furnace and the charge-mixture is supplied as required, the process thus being a continuous one. A body of the charge is preferably employed as the resistance-conductor and the charge is gradually brought to the temperature of reduction by employing an electric current the density of which increases through the charge.

A suitable electric resistance furnace is shown in the accompanying drawing, in which the figure is a vertical axial section through the tap-holes.

The furnace is a vertical stack comprising a downwardly-converging body 1 of refractory electrically-non-conductive material, such as magnesia, silica, siloxicon or chromite, surrounded by a water-jacket 2. The body is supported upon a horizontal metal plate 3, preferably of cast-steel, having a chamber 4 for the circulation of water and an electric terminal 5. This plate constitutes the lower electrode. Supported upon the body 1 but insulated therefrom by a layer 6 of refractory non-conductive material is the upper electrode 7, a downwardly-converging water-jacketed iron ring having a terminal 8, the inner surface of the ring being bare so that it may contact with the charge. Supported upon the ring-electrode is an iron dome 9 which carries a bell-and-hopper charging mechanism 10. An outlet flue 11 for waste gases extends from the dome. Tap-holes 12, 13 extend through the body 1 at different heights. In employing this furnace to carry out the process, an electrically-conductive charge is fed into the furnace until it covers the inner face of the electrode-ring 7. The charge may consist of a mixture of silica, iron or iron ore and coke, the ingredients being in such proportion as to make it a conductor when hot. Initial current-paths between the electrodes may be provided. The

conductivity of the charge may be increased by using a mixture containing lumps of coke or magnetite, or pieces of iron, which lie in contact with each other at various points and thereby afford direct paths for the flow of current. An electric current is then passed between the electrodes and through the charge, serving as a resistance conductor, and the charge is thereby heated, the temperature increasing toward the hearth by reason of the decreasing cross-section and increasing current and energy density, to a zone where reduction is effected. The reduced silicon and iron form a molten alloy, which collects in the lower part of the furnace and may be withdrawn through the tap-hole 13. A layer 14 of the alloy solidifies upon the base-plate 3 and thereafter serves as the lower electrode. If the charge contains impurities, any resulting slag is removed through the upper tap-hole 12.

I claim:—

1. The continuous process of producing ferrosilicon, which consists in smelting a charge containing a silicon compound, carbon and a source of iron, by means of an electrically-heated resistance-conductor, withdrawing the molten product from the furnace, and supplying the charge-mixture as required, as set forth.

2. The process of producing ferrosilicon, which consists in smelting a charge containing a silicon compound, carbon and a source of iron, by passing an electric current through the charge, serving as a resistance-conductor, withdrawing the product from the furnace, and supplying the charge-mixture as required, as set forth.

3. The process of producing ferrosilicon, which consists in smelting a charge containing a silicon compound, carbon and a source of iron, by passing an electric current through the charge, serving as a resistance-conductor, and increasing the current or energy density through the charge to a point where reduction is effected, withdrawing the product from the furnace, and supplying the charge-mixture as required, as set forth.

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

EDGAR F. PRICE.

Witnesses:

G. E. Cox,
D. BURGESS.