

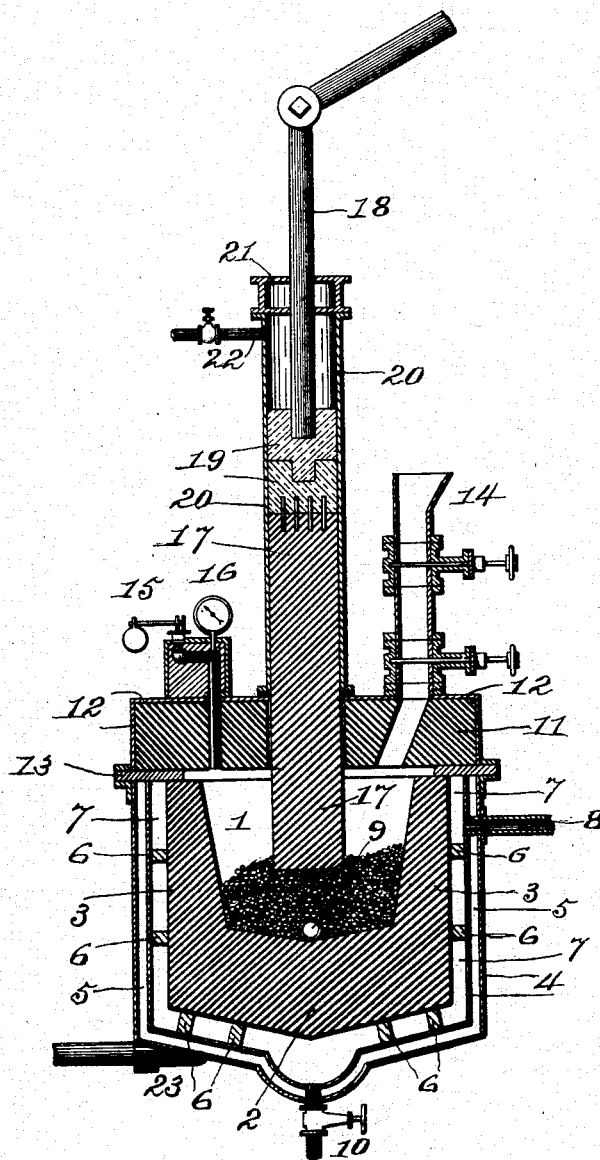
No. 676,576.

Patented June 18, 1901.

A. H. COWLES.
ELECTRODE CONNECTION FOR ELECTRIC FURNACES.

(Application filed Aug. 30, 1900.)

(No Model.)



Witnesses
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UNITED STATES PATENT OFFICE.

ALFRED H. COWLES, OF CLEVELAND, OHIO, ASSIGNOR TO THE ELECTRIC SMELTING AND ALUMINUM CO., OF SAME PLACE.

ELECTRODE CONNECTION FOR ELECTRIC FURNACES.

SPECIFICATION forming part of Letters Patent No. 676,576, dated June 18, 1901.

Original application filed November 24, 1899, Serial No. 738,201. Divided and this application filed August 30, 1900. Serial No. 28,608. (No model.)

To all whom it may concern:

Be it known that I, ALFRED H. COWLES, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Electrode Connections for Electric Furnaces, of which the following is a specification.

This invention relates to electric furnaces, and particularly to an electrode connection and means to prevent the outward passage of vapors from the furnace-chamber around the electrode, as shown in my application filed November 24, 1899, Serial No. 738,201, of which this application is a division.

The object of the invention is to provide a furnace for general electric uses having a gas-tight pipe, an electrode working in the pipe, and a neutral or reducing gas-inlet to the pipe to prevent the outward passage of vapors from the furnace-chamber around the electrode and the condensation of reduced vapors from clogging up the said pipe.

In the accompanying drawing, forming part of this application, the figure is a central longitudinal section.

The same numeral references denote the same parts in the view of the drawing.

My invention being applicable for general electric-furnace use, I shall only describe a form of furnace for the exemplification thereof.

The furnace-chamber 1 has a hearth 2 and walls 3, both being permeable to gases and vapors from the chamber. A metallic double-walled jacket or casing 4, which forms a water or cooling chamber 5, is provided with suitable water inlet and outlet pipes, (not shown,) and the inner wall of the jacket 4 is held away from the carbon hearth 2 and the carbon walls 3 by metallic blocks or stays 6 to prevent the said inner walls of the jacket from becoming heated to too great a temperature and to form a space 7 between the latter and the walls 3 and hearth 2, into which the gases and the vapor are discharged from the furnace-chamber 1 through the numerous pores and openings in the walls and hearth for condensation therein. The purpose of the cooling-jacket is to maintain the temperature of the space 7

at the proper temperature to effect condensation of the fumes or vapor discharged thereinto, as above noted. An exhaust-pipe 8 extends from the upper part of the condensing-space 7 out of the jacket 4, and through which the carbonic oxid generated in the operation is passed off, assisted, if need be, by a suction-blower or equivalent device. (Not shown, but which may be attached to the pipe 8.) At the bottom of the furnace-chamber a tap-hole 9 is provided, and the bottom of the jacket 4 is provided with a discharge-pipe 10 for drawing off the products condensed in the space 7.

The top or cover 11 of the furnace is composed of compacted carbon incased outwardly by an iron shell 12, and an insulating material 13 is placed between the cover and the body of the furnace. The furnace-top is provided with an ore-feeding hopper 14, a safety-valve 15, and a pressure-gage 16. An electrode 17 extends from the ore charge in the chamber 1 and is attached to an electrode terminal rod 18 by means of metallic plugs 19 and has suitable connections with the electric circuit generated by a dynamo or other continuous or alternating current.

My invention lies in the pipe 20, connected to but insulated from the metallic shell 12 of the top or cover 11, through which the electrode 17 passes and plays in the pipe 20. At the top of the pipe 20 is a stuffing-box 21, through which the electrode-terminal 18 extends, so as to leave the said pipe practically gas-tight, and just below the stuffing-box the said pipe is provided near its top with an inlet-pipe 22, through which a small quantity of hydrocarbon, neutral, or reducing gas or gas-forming liquid is passed into the upper part of the pipe 20 or the open space or chamber left therein above the electrode, which will prevent any small amount of vapor from passing up around the electrode 17. A sufficient amount of hydrocarbon gas can be admitted to the pipe 17 to maintain a slight escape thereof down around the said electrode. One of the cables for the electric current is attached to the rod 18, and the other cable is attached to the casing or jacket 4 at 23 or at any other desired point about the said casing.

The course of the electric current is from

the circuit-cable connected to the electrode 17
through the ore charge, the walls and hearth
of the furnace-chamber, the stay-blocks, and
the casing or jacket to the other circuit-ter-
5 minal.

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

10 The combination, with an electric smelting-
furnace having a closed top, and an electrode
extending from the furnace-chamber through
the said top, of a gas-tight pipe fitting around

and making a close joint with the electrode
so as to form a chamber between the top of
the electrode and the pipe, and a gas-inlet to 15
the chamber discharging upon the top of the
electrode to prevent the passage of vapor
through said joint, substantially as set forth.

In witness whereof I hereunto set my hand
in the presence of two witnesses.

ALFRED H. COWLES.

Witnesses:

NELLIE J. WILLS,
C. A. BENNER.