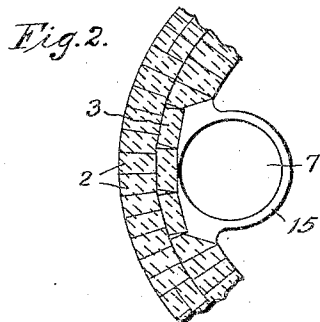
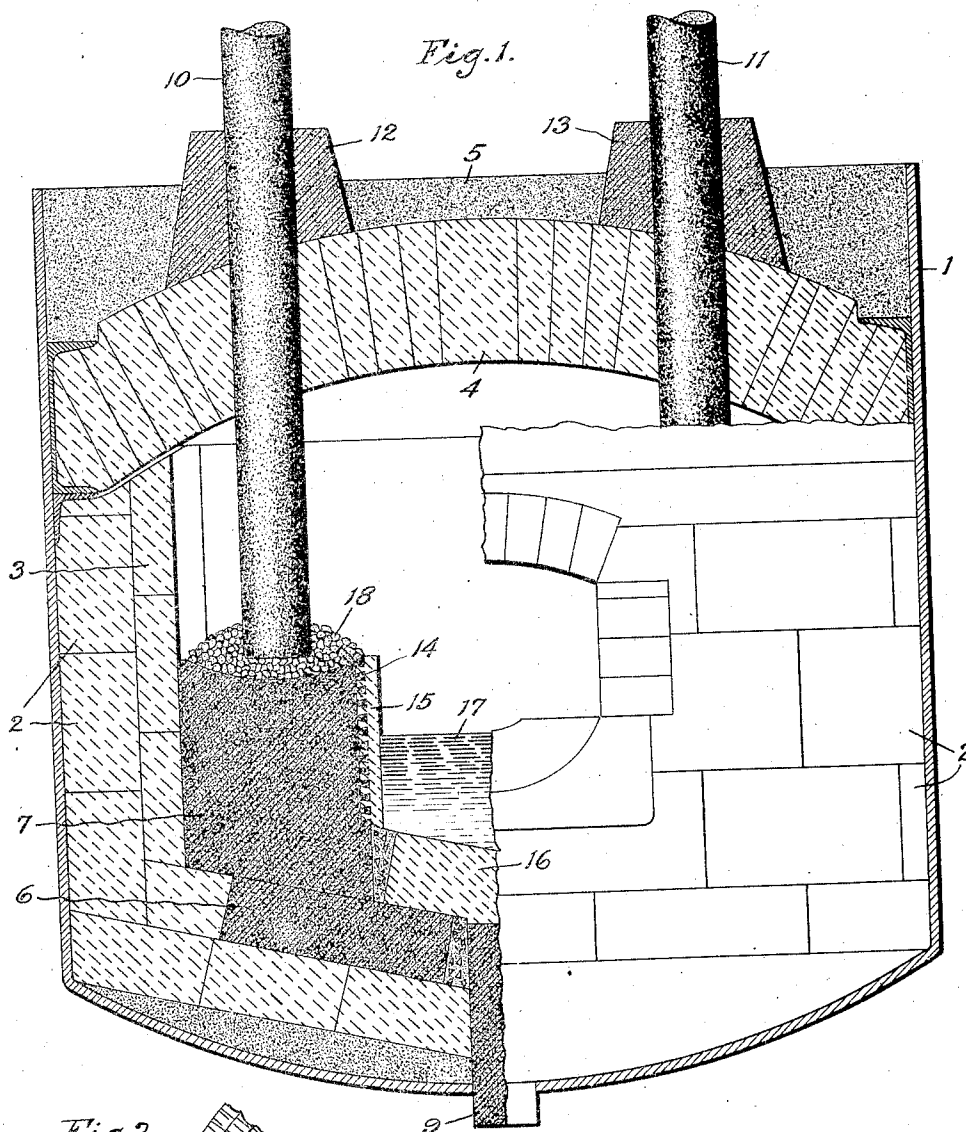


Aug. 25, 1925.

1,551,396

C. L. IPSEN
ELECTRIC FURNACE
Filed Sept. 12, 1921



Inventor:
Carl L. Ipsen,
by *Alfred H. Davis*
His Attorney

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UNITED STATES PATENT OFFICE.

CARL L. IPSEN, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC FURNACE.

Application filed September 12, 1921. Serial No. 499,809.

To all whom it may concern:

Be it known that I, CARL L. IPSEN, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Electric Furnaces, of which the following is a specification.

The present invention comprises an improvement in electric furnaces of the arc type. When the arc is used as a source of heat for metallurgical operations carried out materially below are temperatures, such as brass melting, it is necessary to moderate the heating intensity by shielding the charge from the direct radiation of the arc.

In accordance with my present invention, I have provided an improved furnace in which the charge is protected by a shield which at the same time protects the hearth electrode adjacent the charge from oxidation and thus prolongs the life of the furnace.

The accompanying drawing comprises in Fig. 1 a front elevation, partly in section, of a furnace embodying my invention; Fig. 2 being a cross-section on a smaller scale of the lower electrode and part of the adjoining wall.

Referring to the drawing, the furnace container comprises a housing 1 of sheet iron lined with shaped and fitted blocks 2 of refractory material, the inner layer 3 preferably consisting of carborundum brick. The vaulted roof 4 consists of a good grade of fire brick, above which is a layer of comminuted heat insulating material 5, which may be omitted. Resting on a conducting base 6 of the furnace are stationary electrodes, only one of which, numbered 7, is shown. Both the base 6 and the electrodes consist of carbon or graphite. An electrode 9 passes through the bottom of the furnace for connection to a suitable automatic control apparatus. Movable arc electrodes 10, 11, pass through refractory sleeves 12, 13, consisting of a carborundum composition in the roof of the furnace and contact with the corresponding lower electrodes.

In order to preserve the lower electrodes from deteriorating influences they are coated with layers of an oxidation resisting material, such as carborundum cement. Preferably grooves 14 are provided in the surface of the lower electrodes, as indicated,

to securely anchor the layer of protective material 15 upon the surface. A layer 16 of carborundum brick upon the base of the lower electrodes constitutes a hearth upon which a charge 17 of molten brass or the like may be maintained. The movable electrodes 10, 11 are of smaller diameter than the cooperating stationary electrodes so that when the upper electrodes are in arcing relation to the lower electrodes the arcing tips of the upper electrodes may be surrounded by a layer 18 of granular carbon. The upper arcing end of the lower electrodes preferably is made somewhat hollowed or dished. The furnace may be provided with any desired number of electrodes, altho two only have been indicated, and operate with single or polyphase current supply. For example, when the furnace shown is operated with a single phase power supply, suitable connections are made to the electrodes 10, 11, and the current passes from one of the upper electrodes to the corresponding lower electrode through the conducting base to the other lower electrode, from thence to the other upper electrode.

By my improved construction space is economized and an improved thermal efficiency is secured as compared with former constructions utilizing a separate baffle wall between the electrodes and the charge. The shape and location of the electrodes together with the coating 15 upon the lower electrodes shields the charge 17 from direct heat radiation of the arc and at the same time the lower electrodes are protected from oxidation. Heat is conveyed by direct conduction from the lower electrodes to the charge.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. An electric furnace comprising a carbonaceous electrode having a coating of heat-conducting oxidation resisting material, a second electrode of smaller diameter in operative arcing relation thereto, and a container surrounding a space about the arcing tips of the electrodes, said container providing a hearth adjacent said coated electrodes.
2. An electric furnace comprising a container, an electrode located on the base of said container having a heating space adjacent, said electrode being provided with a surface layer of heat-conducting, oxidation

resisting material, a second electrode of lesser diameter than said first electrode projecting through the roof of said container into arcing relation with said first electrode.

5 3. An electric furnace comprising a container, a plurality of electrodes arranged about a heating space on the base of said container, said electrodes having a depression upon their upper surface and being provided with a surface layer of material resisting disintegration by an arc, and electrodes of smaller diameter respectively projecting into said depressions in arcing relation to said first-mentioned electrodes.

10 4. An electric furnace comprising a furnace chamber, an electrode located on the base of said chamber in direct heat conducting relation with the charge, said electrode being provided with grooves, a layer of heat
15 conducting, oxidation resisting material secured

in said grooves and providing a protecting coating on said electrode, and a second electrode arranged in arcing relation with said first electrode.

5 5. An electric furnace for melting metals comprising heat refractory walls forming a furnace chamber, a carbon electrode secured in the bottom of said chamber in heat conducting relation with the charge, said electrode being provided with grooves in its
10 surface adjacent said charge, a layer of carborundum cement secured in said grooves providing a heat protecting coating on the exposed portion of said electrode, and a
15 second electrode extending into said container in arcing relation with said first electrode.

In witness whereof, I have hereunto set my hand this 10th day of September 1921.

CARL L. IPSEN.