Dec. 31, 1929. C. E. CORNELIUS 1,741,977

ELECTRIC FURNACE

Filed Nov. 10, 1928

Fig. 1.

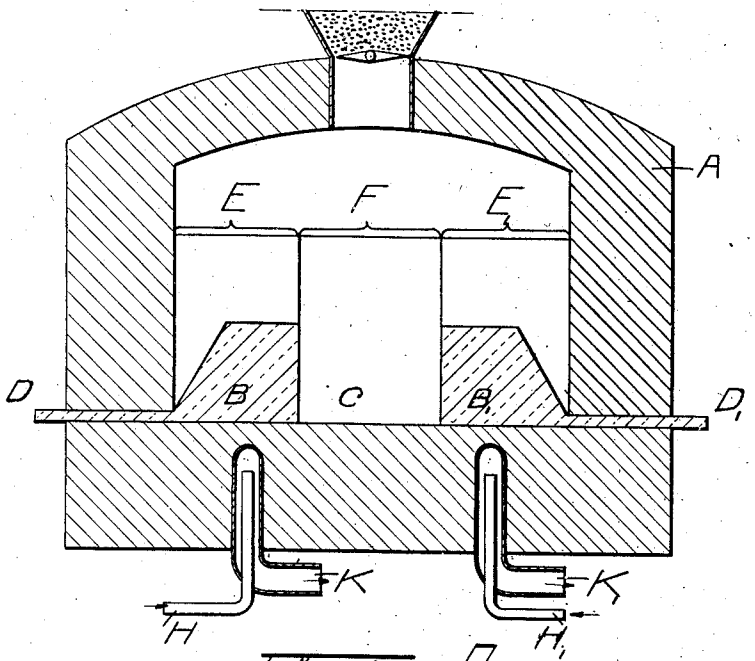
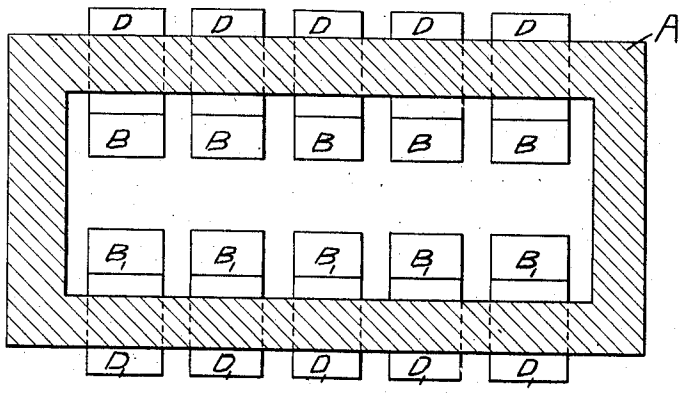


Fig. 2.



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UNITED STATES PATENT OFFICE

CORNELIUS ERIC CORNELIUS, OF STOCKHOLM, SWEDEN

ELECTRIC FURNACE

Application filed November 10, 1928, Serial No. 318,365, and in Sweden January 9, 1928.

In electric resistance glass producing furnaces it has always met with great difficulties to make the brickwork last. The walls have been consumed after a short time and large hollows arise especially in the surface of the bath. Even local damages may arise in the brickwork which may only be accounted for by their flowing from local overheating of the bath.

This invention has for its object an electric glass producing furnace which works without damaging the furnace lining, and in the said furnace both acid and basic substances may be molten without the lining being impaired to speak of.

The characteristic features of the invention are as follows. The material, i. e. glass, to be produced forms resistance to the electric current and metal blocks freestanding on the bottom of the furnace serve as electrodes, the said blocks being surrounded on all sides except on the bottom by the material to be produced. For avoiding corrosion of the bottom of the furnace the lining is cooled by water, air or in another suitable manner at a point of the lining located beneath the electrode blocks. The electrodes may be made from a single metal or from a compound metal. Hitherto, iron free from carbon (C=0.03%) has given the best result.

An embodiment of the invention is shown in the accompanying drawing where

Figure 1 is a vertical section of the furnace and

Figure 2 is a horizontal section of same.

A is the furnace lining. On the bottom of the furnace the electrodes B and B_1 are located freely and surrounded by the glass forming the molten resistance C. The electric current is supplied to the electrodes B and B_1 by the connections D and D_1. The electric current is transposed into heat in the zone F. In the centre of the said zone the highest temperature arises which decreases somewhat towards the opposite faces of the electrodes, but the current tends to keep the electrodes as warm as the said zone. In case the electrodes are colder than the resistance the greatest discharge of heat occurs quite near the surfaces of the electrodes. A position of equilibrium arises when the electrodes carry away by conduction a constant quantity of heat from the zone F to the zones E and E_1. The zones E and E_1 may be increased or decreased by lengthening or shortening the electrodes. By the said arrangement the furnace walls are preserved against being affected because the glass material behind the electrodes is currentless and relatively cold. Or in other words, the proper melting takes place in the centre portion F of the furnace, far from the furnace walls. The cooling of the brickwork beneath the electrodes is effected by introducing into the tubes H and H_1 water, air or another suitable refrigerant which escapes through the tubes K and K_1 after the cooling. The charge is supplied through an opening, not shown, in the vault of the furnace.

According to Figure 2 the furnace has five pairs of electrodes. Between each pair of electrodes there is a free space which is filled up by the molten resistance. This is also the case behind and above the electrodes.

The said furnace is adapted to the melting or the production of glass, water-glass, cement, phosphates and other similar substances, and then the respective substances serve as resistance to the electric current.

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

1. An electric furnace for melting or producing glass, water-glass, cement and other substances, in which the substance which is melted or produced forms a resistance for the electric current, comprising solid metal electrodes having a large heat accumulating capacity in relation to the substance to be treated, said electrodes being freestanding on the bottom of the furnace and exposed to the liquid resistance.

2. An electric furnace for melting or producing glass, water-glass, cement and other substances, in which the substance which is melted or produced forms a resistance for the electric current, comprising solid metal electrodes having a large heat accumulating capacity in relation to the substance to be treat-

ed, said electrodes being freestanding on the bottom of the furnace and surrounded by the liquid resistance on all sides, except on the base.

In witness whereof, I have hereunto signed my name.

CORNELIUS ERIC CORNELIUS.