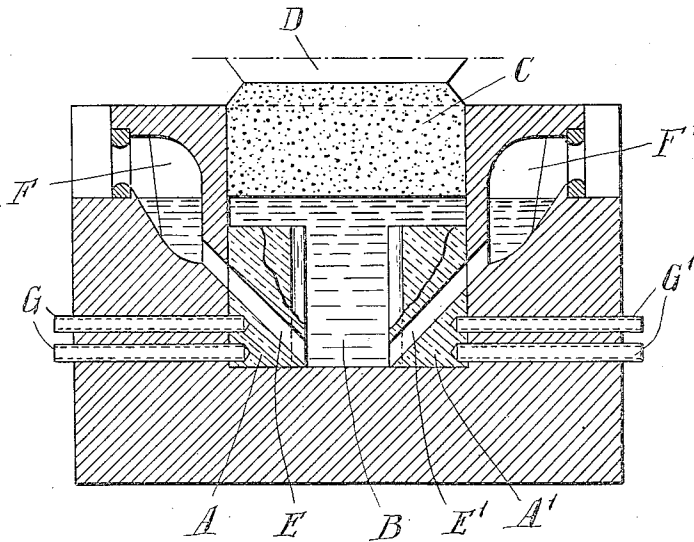


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C. E. CORNELIUS
ELECTRIC FURNACE FOR MELTING OR PRODUCING GLASS, WATER GLASS,
CEMENT, OR OTHER SUBSTANCES
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ELECTRIC FURNACE FOR MELTING OR PRODUCING GLASS, WATER-GLASS, CEMENT, OR OTHER SUBSTANCES.

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Hitherto various suggestions and attempts have been made to produce glass electrothermically, but these suggestions and attempts have always given negative results on account of the glass at the melting being to a greater or lesser extent fouled by electrodes and such like. The glass is namely extremely sensitive to the minutest impurity and may not be exposed to any super-heating or to a long heating, as it will then easily crystallize and become opaque.

The present invention, which refers to a furnace for melting glass, water-glass, cement or other substances, is the result of a series of experiments and is a solution of the electro-thermic melting problem in a rational and economic manner. The invention is based partly upon the observation of the fact that iron objects submerged into molten glass do not undergo any change, and partly upon the fact that glass in a molten condition is a conductor of electric current.

The melting furnace is constructed on the principle of resistance, and as resistance molten glass is used, and as electrodes is used iron free from carbon or iron with a small percentage of carbon or some other suitable metal or metal alloy with a sufficiently high melting point. The metal electrodes are so adapted that they are able to accumulate or store within themselves a large amount of heat so as to be able to keep the molten mass at the desired temperature, if there is any tendency to variation in the same. The electrodes must be provided with a pyrometer which indicates their temperature. By means of the pyrometer it is also possible with a simple device to regulate the supply of current to the furnace. As has been mentioned the metal electrodes act accumulatively and tend to assume the same temperature as the substance that is being melted. The condition for the possibility of using metal electrodes is not only the one, that they must have a large capacity for accumulating heat; they must also have a large surface for being able to rapidly absorb and deliver the heat. The surfaces of the metal electrodes are therefore corrugated, or the electrodes are given large surfaces in some other manner. The transmission of

heat per surface unit may not be greater than that the heat has plenty of time to pass from the surface to the interior of the metal electrode. In order to transmit the heat to the interior of the metal electrodes the latter are provided with channels through which the molten material is allowed to pass before leaving the furnace. The material in question is in this manner thoroughly treated with heat.

As an example of the advantage of the heat accumulating electrodes it may be mentioned that, if their total weight amounts to 1000 kg. and they are made of wrought iron, 40 kwh. are consumed for raising the temperature from 1200 to 1400° centigrade. In this manner the temperature is perfectly under control, and there is no need to fear any surprises of rapid or local variations of temperature.

Another advantage of the present invention consists in the fact that in the event of any interruption in the distribution of the electric current occurring, the work can go on undisturbed, this being due to the accumulated heat.

On the accompanying drawing is shown one form of the invention adapted for the manufacture of glass. A and A' are the heat accumulating metal electrodes between which the molten glass B is situated. The charge C is supplied from the tank D as the melting process is going on. The molten glass B passes through the channels E and E' to the working chambers F and F', where the glass is removed and subjected to treatment. The electric current is conducted to the furnace by means of tubes G and G', which are screwed into the respective heat accumulators.

The remarks made above about glass hold good also for the melting or producing of water-glass, cement and other substances.

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.

2. An electric furnace according to claim 1, characterized by the metal electrodes being provided with channels, through which the chamber with the molten material is connected with a plurality of outlets for the

said substance and a fairly large contact surface between the said material and the electrodes is obtained.

In witness whereof I have hereunto set my hand.

CORNELIUS ERIK CORNELIUS.