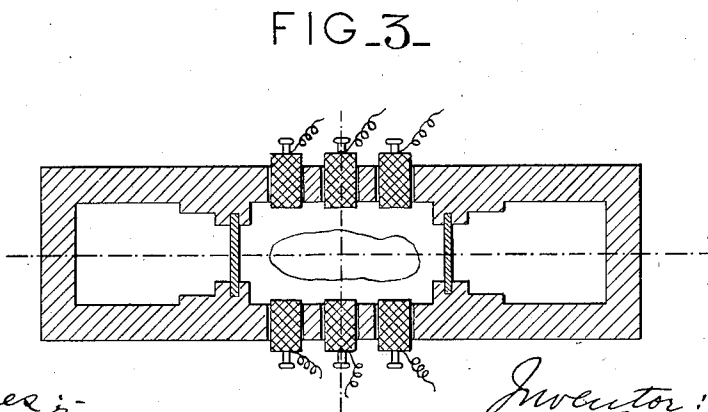
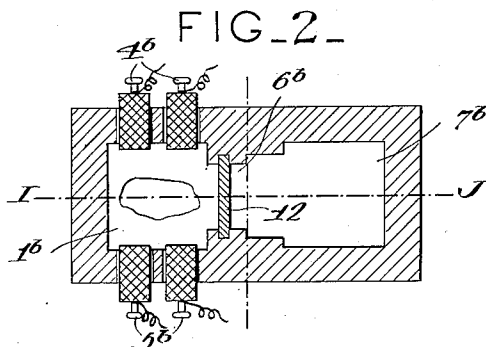
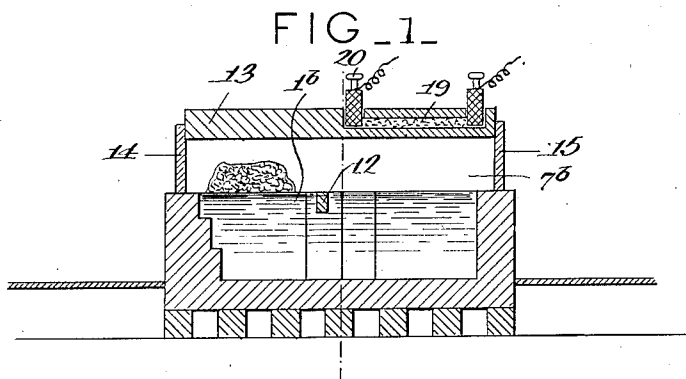


M. SAUVAGEON.
ELECTRIC FURNACE FOR THE CONTINUOUS MANUFACTURE OF GLASS.
APPLICATION FILED AUG. 5, 1909.

1,062,362.

Patented May 20, 1913.



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UNITED STATES PATENT OFFICE.

MARIUS SAUVAGEON, OF COLOMBES, FRANCE.

ELECTRIC FURNACE FOR THE CONTINUOUS MANUFACTURE OF GLASS.

1,062,362.

Specification of Letters Patent.

Patented May 20, 1913.

Application filed August 5, 1909. Serial No. 511,375.

To all whom it may concern:

Be it known that I, MARIUS SAUVAGEON, a resident of Colombes, Seine, France, a citizen of the French Republic, have invented certain new and useful Improvements in Electric Furnaces for the Continuous Manufacture of Glass, of which the following is a specification.

This invention relates to furnaces for the manufacture of glass, or vitreous silicates generally, more particularly furnaces of the type in which the high resistance of molten glass to the passage of an electric current is availed of for the production of the heat required to melt down the raw materials.

The primary object of the invention is to provide a furnace of this character in which the minimum amount of electric energy shall be required.

A further object is to provide convenient and effective means for maintaining the manufactured glass at a temperature suitable for working.

To these and other ends the furnace is so constructed and arranged, as more fully described hereinafter, that the only operations in the manufacture which require heat shall be confined to a single chamber of relatively small size, so that the heat will be utilized at the point of its development, or, conversely, will be developed at the point where it is needed. In other words, a single source of heat, namely, the flow of current through a single mass of molten glass, is employed for the melting and refining operations. In combination with the melting and refining chamber is a working chamber into which the finished glass flows at substantially its rate of production. This working chamber is also a cooling chamber, in which the fluid glass from the melting and refining chamber cools down to a suitable temperature for working, that is, for blowing or such other processes as are employed to transform the glass into articles of commerce. By thus combining the operations requiring heat, that is, the melting and refining, and by localizing or confining the production of heat to a single chamber I am enabled to materially reduce the amount of heat needed, and, in consequence, the electric power

or energy required, without reduction of the amount of glass produced. Moreover, by suitable arrangement of the melting and refining chamber I am able to employ low voltage current, thereby practically eliminating the danger to the workmen, who, where high voltages are used, run considerable risk in handling such circuits.

Several embodiments of the invention are illustrated in the accompanying drawings, and referring now thereto, Figure 1 is a horizontal section illustrating one form of furnace. Fig. 2 is a vertical section on line I—J. Fig. 3 is a horizontal section showing a similar form of furnace but with two working chambers fed from the same melting and refining chamber.

In the furnaces illustrated, the melting and refining chamber, designated by 1^b, is compact in form and the electrodes, 4^b, 5^b, are at the sides of the chamber, so that the course of the current is across the chamber and the current path is correspondingly short. The total resistance being low by reason of the short current path and its large cross section, low voltage current may be employed, with lessened danger to the workmen, who would otherwise run some risk of injurious shock in handling high tension circuits. The working chamber 7^b, at the end of the melting and refining chamber, is in communication therewith through an outlet passage 6^b but is separated therefrom by a floating barrier or dam 12. Over the whole is a roof 13, having openings at its ends provided with removable closures 14, 15, to permit introduction of raw material into the melting and refining chamber and the withdrawal of the finished glass from the working chamber whenever desired. With the low tension current employed in these furnaces the temperature in the working chamber is low enough to permit withdrawal of the glass therefrom by the direct introduction of a blow-pipe or ladle.

As the frit floating in the melting and refining chamber melts down the dam 12 permits the refined glass to flow under it into the working chamber but prevents contamination of the refined glass in the latter cham-

ber by the inflow of imperfectly melted portions. The furnace is started with a mass of molten glass poured into the melting and refining chamber or by the agency of an arc, as will be readily understood.

In the furnace shown in Fig. 3 two working chambers are provided, fed from the same melting and refining chamber, the capacity of the latter being correspondingly increased.

Where low tension currents are used, it may happen that the glass, leaving the melting and refining chamber at a relatively low temperature, may cool down too much in the working chamber. To obviate this, a suitable source of heat may be provided in conjunction with the working chamber to keep up the temperature of the glass therein, as for example a resistance 19 in the roof of the working chamber, connected by terminals 20, 21 with a source of current not shown. The heat is therefore produced where it is utilized, in the melting and refining chamber for the melting and refining operations, and in the working chamber only when needed.

It is to be understood that the furnaces herein specifically illustrated and described are merely convenient and effective forms of the invention, which is capable of other embodiments without departing from its proper spirit and scope.

Other forms of my invention are described and claimed in my Patents Nos. 972,778 and 972,779, issued October 11th, 1910.

I claim:

1. An electric furnace for the continuous production of glass, comprising in combination, a single melting and refining means comprising a melting and refining chamber of relatively small capacity, a mass of molten glass in said chamber, constituting a heating resistance and serving to support by flotation a mass of glass-producing material, and electrodes immersed in the molten glass in said chamber, the heat produced by current through the said mass of molten glass serving to melt the glass-producing material and to refine the resulting glass; and a working chamber receiving glass from the melting and refining chamber.

2. An electric furnace for the continuous production of glass, comprising in combination, a single melting and refining means comprising a combined melting and refining chamber, a mass of molten glass therein constituting a heating resistance and serving to support by flotation a mass of glass producing material, and electrodes immersed in the molten glass in the said chamber and arranged to give a relatively short current-path through the glass whereby to permit the use of low tension current; and a work-

ing chamber located out of the direct path of the current and arranged to receive refined glass from the said melting and refining chamber.

3. In an electric furnace for the continuous production of glass, in combination, a single melting and refining means comprising a combined melting and refining chamber, a mass of molten glass in said chamber, constituting a heating resistance and serving to support by flotation a mass of glass-producing material, and electrodes immersed in the mass of molten glass in said chamber and arranged relatively close together whereby to give a short current-path through the glass and permit the employment of current of low voltage; and a working chamber located out of the direct path of the current and arranged to receive refined glass from the said melting and refining chamber, and means associated with the working chamber for maintaining the molten glass therein at a suitable working temperature.

4. In an electric furnace for the continuous production of glass, in combination, a combined melting and refining chamber having an outlet passage, a mass of molten glass in said chamber, constituting a heating resistance and serving to support by flotation a mass of glass-producing material, electrodes immersed in the molten glass in said chamber and arranged relatively close together whereby to give a short current path through the glass and permit the employment of current of low voltage, a working chamber receiving refined glass from the melting and refining chamber but located out of the direct path of the current, and having a roof, and an electrical heating resistance carried by the roof, for maintaining the glass in the working chamber at a suitable working temperature.

5. An electric furnace for the continuous production of glass, comprising in combination, a single melting and refining means comprising a combined melting and refining chamber having an outlet passage at its end, a mass of molten glass in said chamber, constituting a heating resistance and serving to support by flotation a mass of glass producing material, and electrodes immersed in the mass of molten glass at the sides of the melting and refining chamber whereby the current will flow across the chamber; and a working chamber located at the end of the said melting and refining chamber and arranged to receive refined glass therefrom through said outlet passage.

6. An electric furnace for the continuous production of glass, comprising in combination, a combined melting and refining chamber having an outlet passage at its end, a mass of molten glass in said chamber, constituting a heating resistance and serving to

support by flotation a mass of glass-producing material, electrodes immersed in the said mass of molten glass at the sides of the melting and refining chamber whereby the current will flow across the chamber, a working chamber located at the outlet end of the melting and refining chamber and arranged to receive refined glass therefrom through the outlet passage, and a dam or barrier
10 across the upper part of said passage to

separate the upper portions of the glass in the two chambers.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MARIUS SAUVAGEON.

Witnesses:

H. C. COXE,
DOUMÉ CASALONGA.