M. SAUVAGEON.

ELECTRIC FURNACE FOR THE CONTINUOUS MANUFACTURE OF GLASS.

APPLICATION FILED AUG. 2, 1910.

972,778. **Patented Oct. 11, 1910.**

FIG. 1.

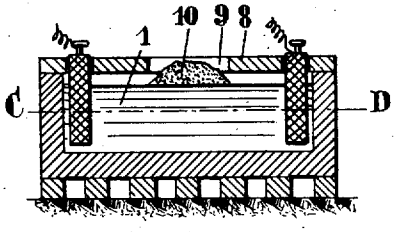


FIG. 3.

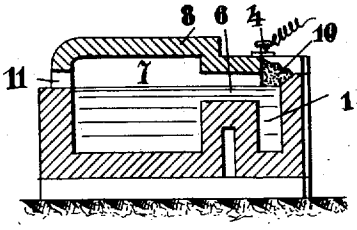


FIG. 2.

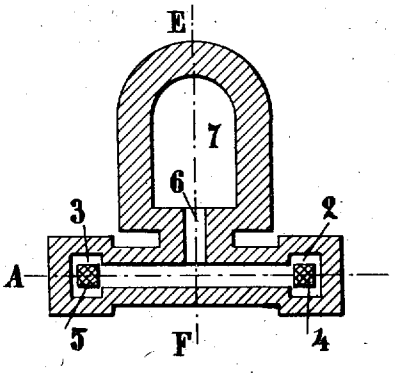


FIG. 4.

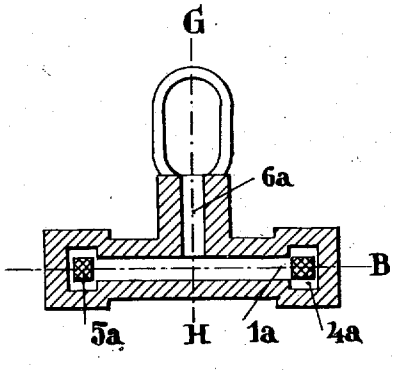
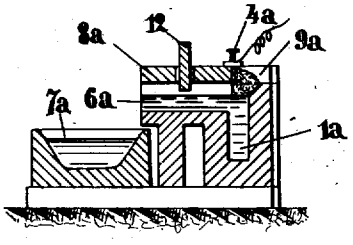


FIG. 5.



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UNITED STATES PATENT OFFICE.

MARIUS SAUVAGEON, OF COLOMBES, FRANCE.

ELECTRIC FURNACE FOR THE CONTINUOUS MANUFACTURE OF GLASS.

972,778. Specification of Letters Patent. Patented Oct. 11, 1910.

Original application filed August 5, 1909, Serial No. 511,375. Divided and this application filed August 2, 1910. Serial No. 575,091.

To all whom it may concern:

Be it known that I, MARIUS SAUVAGEON, a citizen of the Republic of France, residing at Colombes, Department of the Seine, France, have invented certain new and useful Improvements in Electric Furnaces for the Continuous Manufacture of Glass, of which the following is a full, clear, and exact description.

The invention forming the subject of my present application (which is a division of my earlier application filed August 5, 1909, Ser. No. 511,375) relates to electric furnaces for the continuous manufacture of glass, or vitreous silicates generally, and its chief object is to provide an improved furnace which shall be economical in current consumption, simple in construction and convenient in manipulation and control.

To these and other ends the invention consists in the novel features of construction and combinations of elements hereinafter described.

The preferred form of the invention is illustrated in the annexed drawing, in which—

Figure 1 shows the furnace in vertical section, taken longitudinally through the melting and refining chamber, on line A—B. Fig. 2 is a horizontal section on line C—D. Fig. 3 is a vertical section on line E—F, at right angles to the plane of Fig. 1. Fig. 4 is a horizontal section of a modification, in which the working chamber is in the form of a simple pot into which the glass runs from the melting and refining chamber. Fig. 5 is a vertical section, on line G—H of Fig. 4.

In the furnace illustrated in Figs. 1, 2, and 3 a long narrow melting and refining chamber 1 is provided, adapted to contain a mass of molten glass as shown, and formed at its ends with enlargements or pockets 2, 3, to contain the electrodes 4, 5, immersed in the molten glass; which electrodes are connected with a suitable source of current, not shown. Extending from the melting and refining chamber at right angles thereto is a lateral passage or channel 6, opening into a relatively large working chamber 7, and over the entire furnace is a roof 8, of which at least the portion over the passage 6 is removable to afford ready access to the same. Above the melting and refining chamber, at about the center thereof, is an aperture 9, for the introduction of the glass-forming material.

In operating the furnace the two chambers are charged with a mass of molten glass, and current is passed through the glass in the melting and refining chamber between the electrodes 4, 5. The resistance of the molten glass to the flow of the current raises the temperature of the glass and the heat thus generated melts the lower portions of a mass of frit 10 introduced through the opening 9 and floating on the bath of glass in the melting and refining chamber. The fluid glass thus produced spreads or flows, the bubbles of air or other gases escaping rapidly, into the working chamber 7, which is of sufficient size to permit speedy cooling of the glass down to a suitable working temperature. As the frit melts away additional material is charged into the melting and refining chamber, so that the operation described goes on continuously. At the end of the working chamber opposite the melting and refining chamber is an opening 11, through which the finished glass can be removed as fast as desired.

From the foregoing it will be seen that the only operations in the manufacture which require heat are confined to a single chamber of relatively small size, so that the heat is utilized at the point of its development, or, conversely, the heat is 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 this way, by concentrating the heat at the point of utilization the total amount of heat needed, and hence the electric energy consumed, can be largely reduced and the efficiency of the operation increased.

In the furnace shown in Figs. 4 and 5 the melting and refining chamber 1^a, the electrodes 4^a, 5^a, and the passage 6^a are similar to the corresponding parts in Figs. 1, 2, and 3, but the working chamber 7^a, instead of being roofed over, is a simple pot into which the glass from the passage 6^a flows. Over the outlet passage mentioned is a removable roof 8^a, provided with an opening 9^a for the introduction of frit into the melting and refining chamber, and also provided with a vertically adjustable damper or gate 12 over the passage 6^a by which the flow of glass

through the latter may be regulated. In using this furnace the damper 12 is opened wide when it is desired to discharge the refined glass from the melting and refining chamber.

The operation of either furnace may be started by means of a charge of previously melted glass, as already described, or by employing the electrodes for the production of an electric arc, which is then utilized to melt a suitable charge of cullet.

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 departure from its proper spirit and scope.

I claim:

1. An electric furnace for the continuous production of glass, comprising in combination, a combined melting and refining chamber of long narrow form and 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, said chamber being provided with a lateral outlet passage for the delivery of refined glass, electrodes immersed in the molten glass in said chamber at the ends thereof whereby the current flowing between the electrodes will be confined to the melting and refining chamber and the resulting heat will be produced only in said chamber, and a working chamber receiving refined glass from the melting and refining chamber through the said outlet passage.

2. An electric furnace for the continuous production of glass, comprising in combination, a combined melting and refining chamber of long narrow form and relatively small capacity, and having a lateral 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 at the ends thereof, a working chamber of relatively large capacity in communication with the melting and refining chamber through the said outlet passage and receiving refined glass through said passage, and a roof over said chambers, provided with an opening for the introduction of glass-producing material into the melting and refining chamber and an opening for the withdrawal of glass from the working chamber.

In testimony whereof I affix my signature in the presence of two subscribing witnesses.

MARIUS SAUVAGEON.

Witnesses:

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