(No Model.)

D. FETTERS.

FURNACE FOR MELTING AND BLOWING GLASS.

No. 246,109. Patented Aug. 23, 1881.

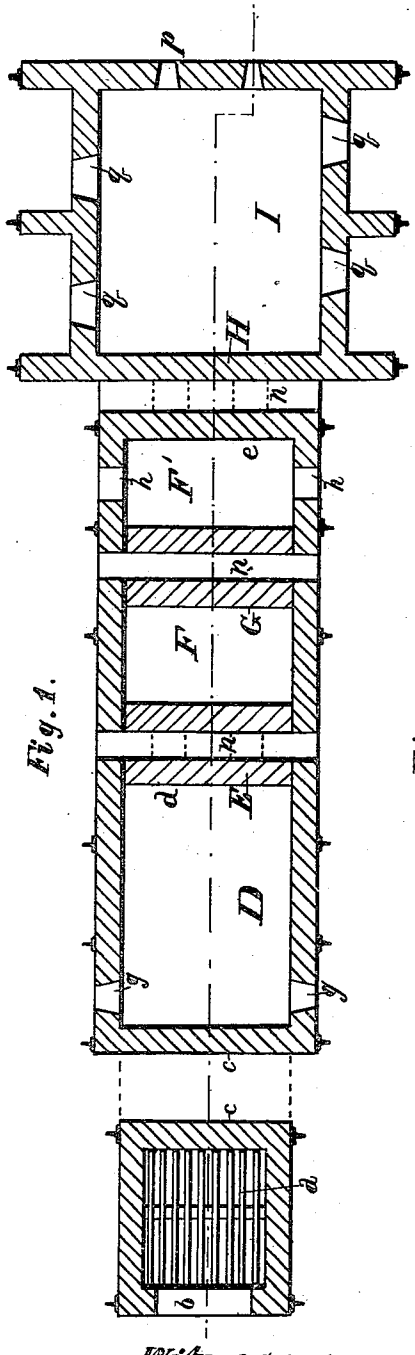


Fig. 1.

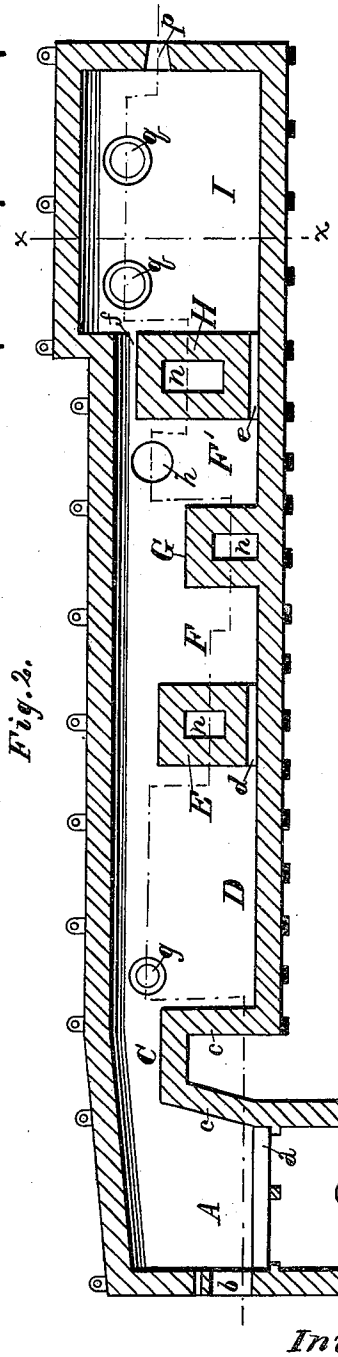


Fig. 2.

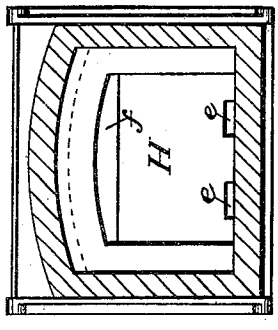


Fig. 3.

Witnesses:
Geo. A. Boyden.
W. A. Rumsen.

Inventor:
David Fetters
By his Atty
Chas. B. Mann

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

DAVID FETTERS, OF BALTIMORE, MARYLAND.

FURNACE FOR MELTING AND BLOWING GLASS.

SPECIFICATION forming part of Letters Patent No. 246,109, dated August 23, 1881.

Application filed April 5, 1880. (No model.)

To all whom it may concern:

Be it known that I, DAVID FETTERS, of the city of Baltimore and State of Maryland, have invented a new and useful Improvement in Furnaces for Melting Glass, of which the following is a specification.

My invention relates to glass-furnaces wherein the operations of melting the stock, refining it, and working it by the blowers are continuous.

The invention consists in a glass-furnace of the character named, having a furnace which is located at one end of a trunk having a horizontal floor, a working-tank at the opposite end, and two intermediate refining-tanks formed by tubular walls, and an intermediate overflow-dam, which is also tubular, as will be hereinafter explained.

The invention also consists in a horizontal glass-furnace having the melting-tanks and the refining and working tanks on the same level, and succeeding one another, in combination with a furnace located at one end of the melting-tank and outlet-flues arranged in the side walls above the second or re-refining tank, between the bridge-wall of the working-tank and the overflow-dam, which is between the two refining-tanks, as will be hereinafter explained.

The construction of a furnace embodying my improvements will first be described, and the invention will then be designated in the claims.

Figure 1 is a sectional plan of the furnace, taken through the line in Fig. 2. Fig. 2 is a sectional elevation. Fig. 3 is a cross-section through line *x x* in Fig. 2, as seen when looking toward the fire-box.

The letter A designates the fire-box, and *a* the grate. The opening *b* to the fire-box is shown in the end.

C designates the partition or fire-bridge, preferably formed by the two separate walls, *c c*.

D is the melting-tank, formed by the bridge C and the hollow-walled partition E, at the bottom of which openings or passages *d* are formed, which communicate from the melting-tank to the refining-tank F. Through these passages the molten glass flows, while the flame and heat are carried by the blast over the partition and across the refining-tanks F F′. As the molten glass enters the refining-tank it continues to flow therein until it reaches the top of the dam or division-wall G, which it overflows. The dam runs transversely of the refining-tank, dividing it into two parts, F F′, and in height the dam is about two-thirds that of the partition E. The molten glass flows from the rear part, F′, of the refining-tank through passages *e* at the bottom, which extend under the hollow partition-wall H, that separates the refining-tank F′ from the blowing-tank I. It will be noticed that the bottom of each tank is on a common level with the others. The partition H is higher than either of the others, there being above its top an opening, *f*, sufficient to permit the heat to enter the blowing-tank. At the forward end of the melting-tank an opening, *g*, is made in each of the side walls, and it is through this opening that the material to be melted is passed in. At the near end, and above the refining-tank F′, an opening, *h*, is made in each side wall, which affords escape for the products of combustion. Both of the openings *g* and *h* may be closed by a suitable stopper whenever the exigencies of the operation require.

By the construction herein shown and described the frit or vitreous material is first melted and made to flow off from the bottom through the passage *d*, and to rise in the tank F and flow over the dam G, and thence from tank F′ it flows off at the bottom through passage *e* into the blowing-tank. Thus the molten frit at the bottom of tank D is brought to the top as it flows over the dam G, where its exposure to the heat insures its thorough liquefaction and effects a refinement of the glass that is of great advantage.

An important feature in the construction of the partitions E and H, under which the passages *d* and *e* respectively are formed, is that each has an air-space, *n*, extending through it and open at the sides, as seen in Figs. 1 and 2. This air-space serves to keep down the temperature of these partition-walls, and thereby prevents leakage, since without the air-space the integrity of the wall with the passages below it would soon be gone.

The blowing-tank I has a greater width than any other part of the furnace. At the end opposite that where the glass enters are two openings, *p*, from which the glass is gathered,

and at each side are two openings, *q*, those on one side not being exactly opposite those on the other, which arrangement obviates the liability of the blowing-tubes inserted from opposite sides to come in contact.

The ash-pit R is directly below the furnace, and at some suitable point an opening is made for inlet of the air-blast from a blower.

The importance of having the second refining-tank, F′, located as described is to secure a more perfect liquefaction by re-refining the glass in its passage in a thin sheet over the dam G, where it is exposed to the intense heat which passes over this dam on its way to the outlet-flues *h h* through the side walls of the re-refining tank.

It will be seen that the highly-heated products of combustion rising from the furnace A pass over the fire-bridge C, expand in the melting-tank D, are then compressed in passing over the partition E, and then again expand over the glass in the refining-tanks, and pass off laterally through the side flues, *h h*. A portion of the heat will enter the working-tank through the passage *f*. It will thus be seen that by my arrangement of the furnace at one end of the melting-tank I cause the heat to pass in a straight line from the furnace over the melting-tank and over the two refining-tanks F′ F², where the currents of heat are retarded somewhat by causing them to diverge at right angles and pass off through the side flues, *h h*.

I am aware that in glass-furnaces it is not new to use an overflow-dam in combination with a single refining-tank; nor is it new to have an arrangement of lateral induction flames arranged over a melting-tank and a refining-tank, and those features I disclaim.

Having described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a glass-furnace of the character named, a furnace located at one end and a working-tank located at the other end, in combination with a melting-tank, a refining-tank, and a re-refining tank, two tubular partitions, an overflow-partition, and side outlets, all located between said furnace and the working-tank, substantially as described.

2. In a horizontal glass-furnace, the combination, with the melting-tank, the working-tank, and the refining-tank F, of the second or re-refining tank, F′, having outlets *h h*, for the heated products, arranged above it, substantially as described.

3. In a glass-furnace of the character described, the process of re-treating the refined glass after its first refining, and then immediately conducting it into the working-tank, in the manner specified.

DAVID FETTERS.

Witnesses:
JNO. T. MADDOX,
CHAS. B. MANN.