(No Model.)

S. M. KANE.

WATER JACKETED EYE PLATE FOR GLASS FURNACES.

No. 265,967. Patented Oct. 17, 1882.

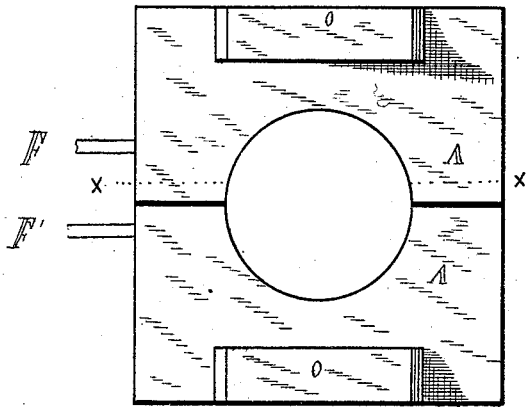

FIGURE 1

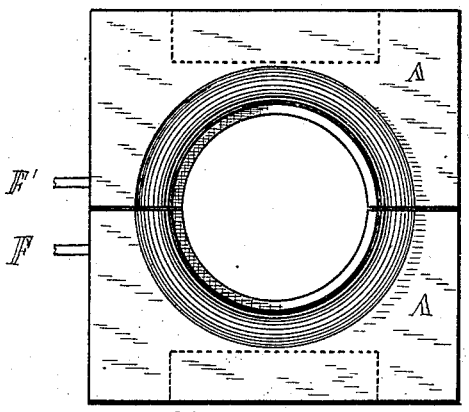

FIGURE 2

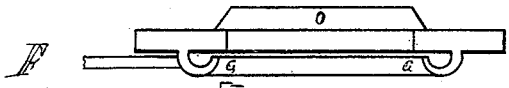

FIGURE 3

Witnesses—

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SAMUEL M. KANE, OF ROCHESTER, PENNSYLVANIA.

WATER-JACKETED EYE-PLATE FOR GLASS-FURNACES.

SPECIFICATION forming part of Letters Patent No. 265,967, dated October 17, 1882.

Application filed June 26, 1882. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL M. KANE, residing at Rochester, in the county of Beaver and State of Pennsylvania, have invented a certain new and useful Improvement in Water-Jacketed Eye-Plates for Glass-Furnaces; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part thereof.

In the construction of glass-furnaces where closed pots are used the walls or bench surrounding the fuel or gas combustion chamber are built on a cast-iron frame, called an "eye-plate." This eye-plate is generally formed in two sections, which, when put together, form a square on their outer edges, and having an annular opening in the center. Where fuel is used in the furnace grate-bars are placed just below the eye-plate. In some cases the fuel is charged above the grate-bars, while in other cases it is forced up through the eye-plate. In either case, whether the fuel is charged from above or below, the annular edge of the eye-plate is exposed to great heat, and in time is fused and permits the fire-wall or bench to drop down, which requires the furnaces to be let out before repairs can be made.

The object of this invention is to construct the eye-plate so as to protect it from fusion, and thus keep the bench-walls of the combustion-chamber in good order. This object I attain by providing the eye-plate with a water-reservoir, thus making a water-jacketed eye-plate. The water-space may be made of many different forms; but I prefer the arrangement shown in the drawings, in which—

Figure 1 is a top view of my water jacketed eye-plate. Fig. 2 is a bottom view of the same. Fig. 3 is a cross-section through *x x*.

The size of the eye-plate may vary with the size of the furnace. I do not make any change in the general dimensions; but as I find in practice that the plates often break between the bearings at O O, I provide them with strengthening-ribs at these points, as shown at Figs. 1 and 3. On the lower side of the plate an annular spout or reservoir (which forms the water-jacket) is placed. The eye-plate A is about three inches thick. The strengthening-ribs are four inches thick, six inches wide, and of a length about two-thirds the width of the plate. The spout or water-jacket should be about four inches deep and six inches wide at the top. The spout may be made separate and attached to the plate in any suitable manner, or it may form a part of the plate. In practice I use the latter method. The inner edge of the spout extends to within one inch of the eye or central opening of the plate and upward within one-half inch of the plate. The ends of these spouts are closed. Each section of the eye-plate is provided with a water-supply pipe, F F′.

When a glass-furnace is furnished with my improved water-jacketed eye-plate the spouts or reservoirs are filled with water through the pipes F F′, and a continuous stream is caused to flow into the reservoirs. The ends being closed, the water is caused to flow over the edge G, and is converted into steam by coming in contact with the heat and hot fuel or hot grate-bars which are beneath. The water in the reservoirs tends to keep the eye-plate cool, and the steam arising from the overflow passes upward around the annular edge of the plate and tends to keep it below the point of fusion, and thus the plate is protected and the fire-walls resting on it are preserved.

Another great advantage of my invention is that the steam formed from the overflow of the reservoirs in passing through the incandescent fuel is decomposed, the oxygen uniting with the carbon of the fuel, forming carbonic oxide, (CO,) which unites with air and is converted into carbonic acid (CO_2.) In the disassociation of each pound of hydrogen of the steam there is an absorption of sixty-one thousand two hundred units Fahrenheit of caloric, which tends to keep the eye-plate, grate-bars, the lower part of the fuel, and the machinery which is beneath for charging at a much lower temperature than when the disassociation of the steam does not take place. When the hydrogen of the steam is set free in passing upward it unites with the oxygen of the air and is again converted into steam, (HO,) and in being so consumed the sixty-one thousand two hundred units Fahrenheit of caloric are again set free, so that, by the use of water so applied, I not

only protect the eye-plate or bench and walls from destruction, but I also secure a comparatively cool bottom and high heat in the upper portion of the fire-chamber or eye of the furnace.

Another important advantage which arises from the use of steam is that I am enabled to keep the furnace at a more uniform temperature. By causing a large amount of water to drip over the lips of the reservoirs the fuel is cooled to such a degree that but little of the water is converted into steam, and the fuel is so cool that but little combustion takes place from the air. Consequently, when the furnace is working too hot an excess of water will cool it; or if it is too cold a moderate amount of overflow will cause an increase of temperature. Thus in practice I find that the furnace may be uniformly charged with fuel from below in the cellar, and the temperature regulated on the upper floor where the glass is made by simply regulating the flow of water into and over the edges of the reservoirs, which is very important, as it is essential to the economic production of good glass that the material should be held continuously at the desired temperature.

I am aware that heretofore a hollow metal wall or channel has been formed on or arranged in the eye of a glass-furnace in order to obtain a circulation of a cooling medium to preserve the eye of the furnace, and do not herein claim the same; but I am not aware that steam has been formed or liberated below the eye-plate in order to reduce the temperature of the eye-plate and grate-bars or to augment the temperature in the upper portion of the furnace. Therefore

What I claim, and desire to secure by Letters Patent, is—

1. A water-jacketed eye-plate for glass-furnaces, constructed and operated so that the water will overflow into the fire-chamber, whereby the plate will be protected and the overflow of water will be vaporized, substantially as and for the purpose set forth.

2. The method herein described for preserving the eye and grate-bars in glass-furnaces, which consists in the introduction of steam below the eye-plate, substantially as specified.

3. A sectional eye-plate having an open water channel or cup upon its under surface, substantially as and for the purpose specified.

SAMUEL M. KANE.

Witnesses:
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