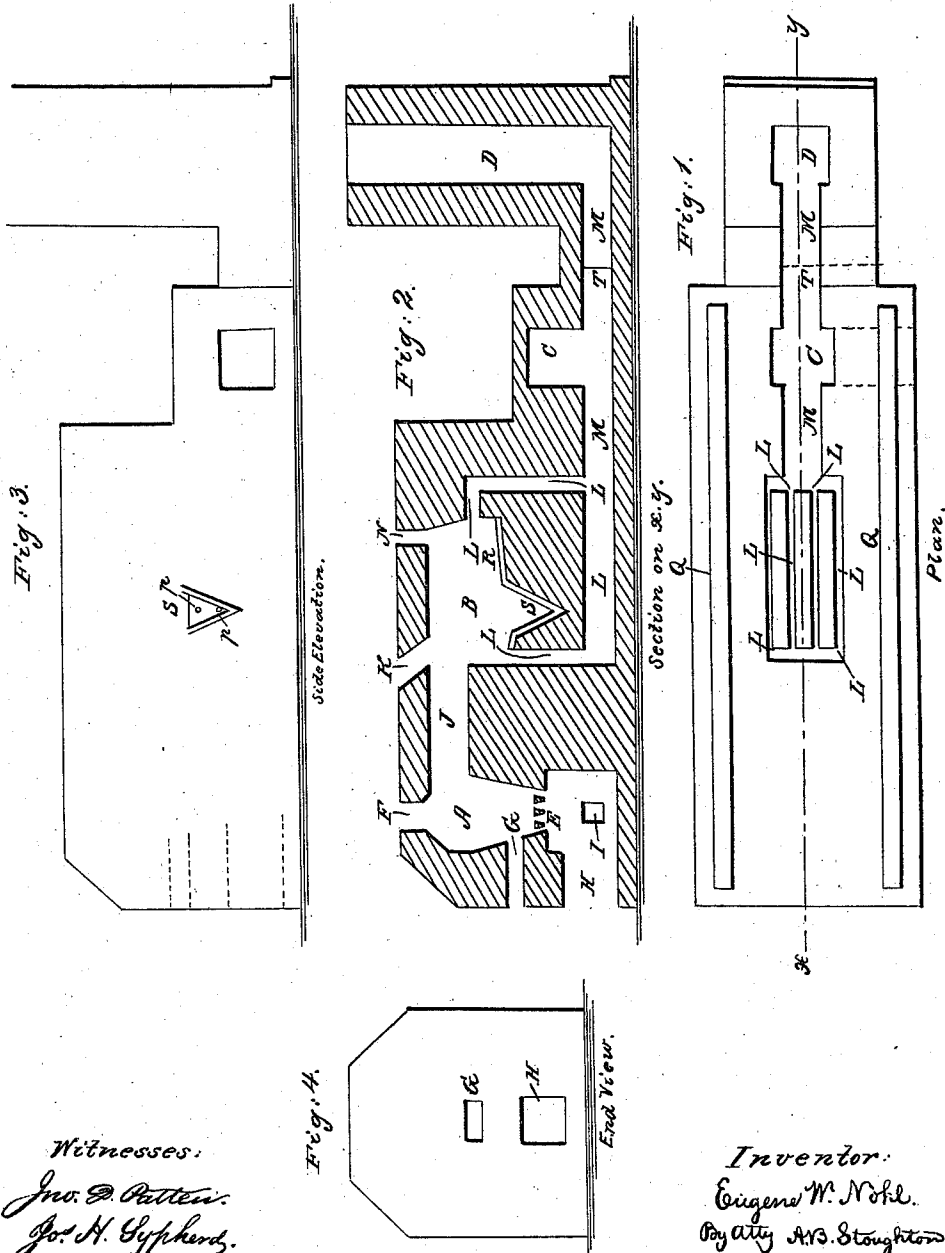


E. W. NOHL.

Furnace for Smelting Ores of Gold, Silver, &c.

No. 81,671.

Patented Sept. 1, 1868.



United States Patent Office.

EUGENE W. NOHL, OF CHICAGO, ILLINOIS, ASSIGNOR TO CHARLES M. GRAY,
OF SAME PLACE.

Letters Patent No. 81,671, dated September 1, 1868.

IMPROVED FURNACE FOR SMELTING ORES OF GOLD, SILVER, &c.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, EUGENE W. NOHL, of Chicago, in the county of Cook, and State of Illinois, have invented certain new and useful Improvements in Furnaces for Smelting Ores, and more especially those containing the precious metals; and I do hereby declare the following to be a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a plan of the bottom of the furnace.

Figure 2 represents a longitudinal vertical section through the furnace at the red line *xy* of fig. 1.

Figure 3 represents an elevation of the furnace, and

Figure 4 represents an end view thereof.

My invention relates to a furnace for smelting ores, and more especially those containing precious metals, such as gold and silver, in which the gaseous products of combustion, arising from fuel burned in said furnace, and mixed and intensified by its admixture with atmospheric air, and directed on to the ores to be smelted, in its most intense state, are used as a fuel.

And my invention consists, first, in the construction and arrangement of the metal or ore-chamber with the cupel in it, and the diving and under flues for heating the same.

And my invention further consists in the introduction of atmospheric air directly in or through the top of the furnace, and above the gas-flue, for the purpose of promoting the combustion of the gases, intensifying the heat, and directing and concentrating the jet or flame of the heated and burning gases upon the ore-bed in the smelting-chamber and into the cupel, which is also at the bottom of said chamber.

And my invention further consists in the use of the hot-air flues under the bottom of the ore-bed and cupel, for the purpose of heating and keeping hot the under portions thereof.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

The fuel-chamber A is furnished with grate-bars E, and an opening, F, at its top, which is designed for supplying the fuel. G is a horizontal opening, leading into the fire-chamber, just above the grate, for raising the fuel and for cleansing the fire-box. H is an opening, leading into the ash-box, for cleaning purposes, and I an air-opening, to admit a blast or current of air to aid combustion.

From the upper portion of the fire or gas-chamber, A, a horizontal passage, J, is made leading into the smelting-chamber, B. In this chamber B, and at the rear thereof, there is an inclined table, R, upon which the ore to be smelted is placed, and at the lowest end of the table R there is a cupel, S, of a wedge or conical form, into which the molten metal or material flows from the table or mass of ore thereon. Two openings, *p p*, fig. 3, are made from the cupel to the exterior of the furnace, one above the other, the upper one for drawing off the slag, and the lower one for drawing off the molten metal.

At each end of the block or bed that contains the table R and cupel S there are diving-flues, L L, and also horizontal flues, L L L L, fig. 1, underneath said bed or hearth, so that it is exposed at top, bottom, and its two ends to the flame and heat, and thus kept intensely heated, so that there is no possibility of chilling the ore or the melted material in the smelting-chamber. The waste heat passes through the flue or passage M to the exit D. Connected with the escape-passage M there is a heating-chamber, C, where the waste heat may be utilized in any way, in desulphurizing the ores, or for any other useful purpose.

Through the top of the furnace there is an opening, K, for admitting, and mixing with the products of combustion from the fire-chamber, atmospheric air, and this opening K may be inclined so as to direct the burning products in a jet or stream upon the ores lying upon the table R. The ores are supplied to the table through the opening N in the top of the furnace immediately over it.

At the sides of the furnace are made openings or spaces, Q Q, which are filled with any good non-conducting

material to prevent the conduction of heat through the walls. The interior of the furnace may be lined with fire-brick, or other fire-resisting material.

Having thus fully described my invention, what I claim therein as new, and desire to secure by Letters Patent, is—

1. The construction and arrangement of the smelting-chamber, with the cupel and diving-flue, for heating the same, substantially as specified.

2. I also claim the opening K through the top of the furnace, and above the gas-flue or passage, for the purpose of admitting, and mixing with the burning products, atmospheric air to intensify the combustion, and direct the flame on the ore-bed or table, and into the cupel, substantially as and for the purpose described.

3. I also claim the flues underneath the ore-bed or table and the cupel, as and for the purpose described.

EUGENE W. NOHL. [L. s.]

Witnesses:

FRANK PARMELEE,
HARPER M. ORAHOOD.