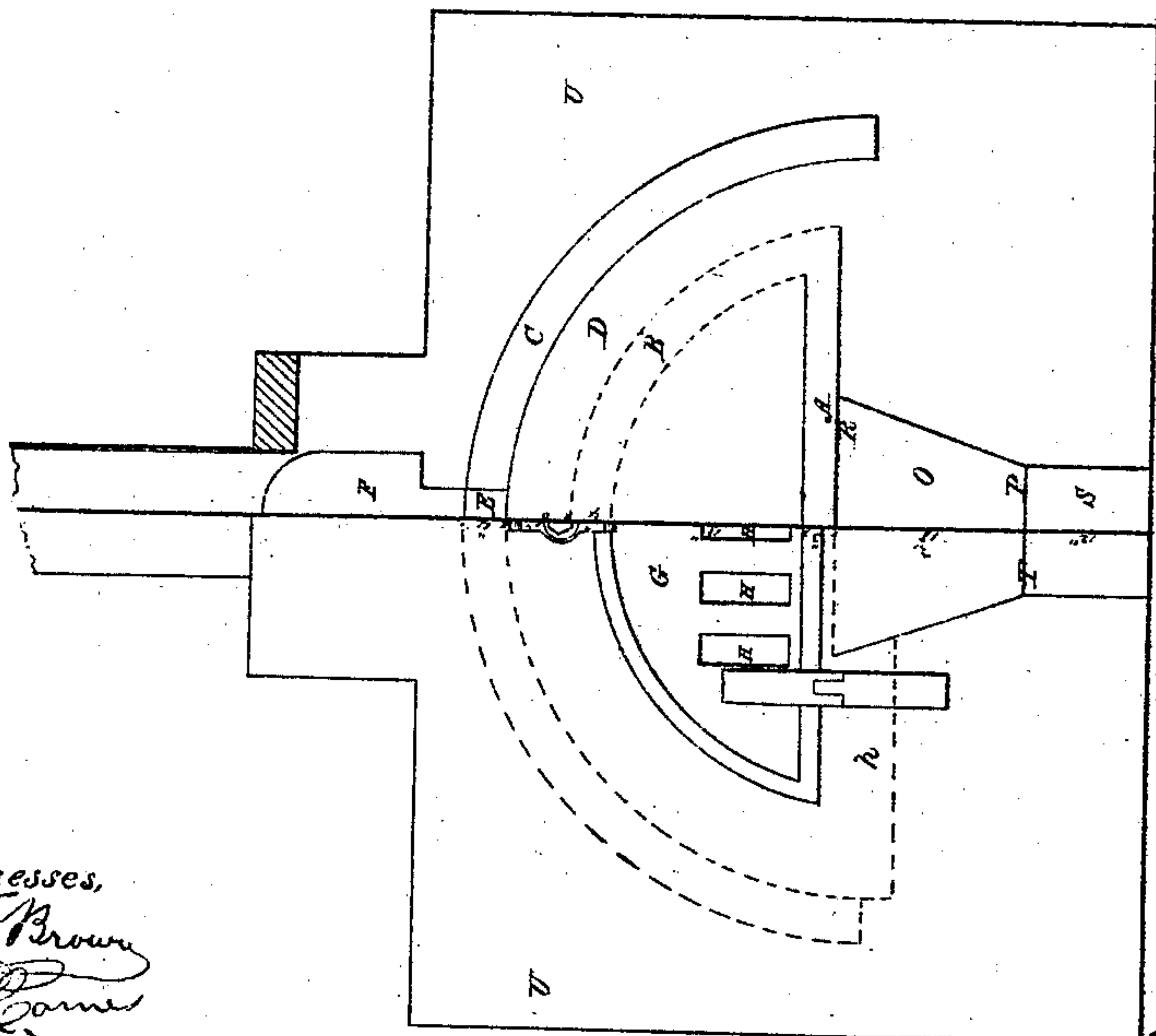
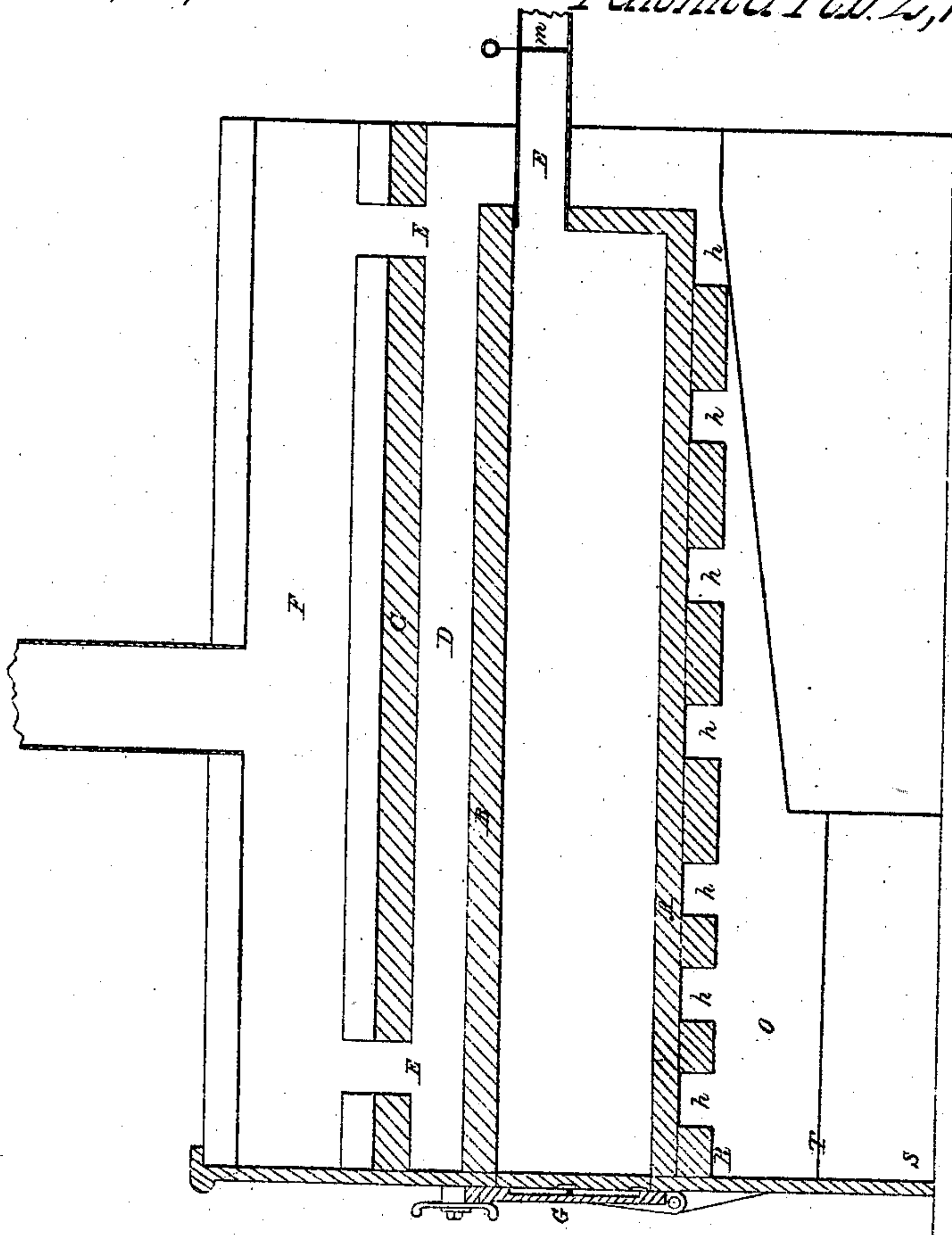


*H. H. Fames.*

*Treating Ores.*

*N<sup>o</sup> 86,514.*

*Patented Feb 2, 1869.*



*Witnesses,*  
*Edm. J. Brown*  
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# United States Patent Office.

HENRY H. EAMES, OF ST. PAUL, MINNESOTA.

Letters Patent No. 86,514, dated February 2, 1869.

## IMPROVEMENT IN DESULPHURIZING AND TREATING ORES FOR THE EXTRACTION OF PRECIOUS METALS.

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, HENRY H. EAMES, of St. Paul, in the county of Ramsey, in the State of Minnesota, have invented a new and improved Muffle-Furnace for the Desulphurization of Ores; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings.

The nature of my invention consists in bringing the ores to a heated state, in a muffle-furnace, without the draught passing over the heated mass, whereby there is a great saving of the precious metals and oxidizing substances employed; also, by means of a sliding door, and an opening for the eduction of the vapors during the oxidation of the sulphur and the base metals, and by the closing of these slides, whereby the whole of the chlorine is preserved, to act upon the precious metals.

It is well known that not only is a great proportion of the precious metals lost, but also that the compounds used for oxidation and chlorination are carried over, when the draught of the furnace is allowed to traverse over the ores and the ingredients used, as in that known as the reverberatory.

I have found that, when the ore is first introduced into the furnace, a certain amount of ordinary air is necessary for the proper oxidation of the sulphur and the base metals. After this has taken place, the whole should be closed, that the chlorine generated may act upon the precious metals without loss either of metals or materials used, as well as the speedy conversion of the precious metals into chlorides.

I have also found that the hearth, arches, and fire-place of my muffle-furnace can be constructed with silex, clay, oxide of iron, common spar, and silicate of soda, formed and dried in a specified manner, as hereinafter stated.

To enable others to make and use my invention, I will proceed to describe it.

My muffle-furnace can be constructed of any size or shape. As an example, I make the hearth or sole A four (4) feet wide by nine (9) feet long and eighteen (18) inches high, over which is an arch, B, four (4) inches in thickness, and corresponding in length and width of hearth.

Over this is another arch, C, four (4) inches thick, and separated by a flue, D, six (6) inches wide, openings E, six (6) inches square, in the back and front of

O, for draught into upper flue F, the door of furnace G, with the slides H, fitting into the mouth of the muffle-furnace, the eduction-pipe I, six (6) inches in diameter, for the vapors during oxidation, with the valve M, for the regulation of the passage of air.

The flues or openings h, under the hearth, are six (6) inches by four (4) inches.

The fire-place O is one foot six inches (1' 6") high, and twelve (12) inches at bottom, P, and spreading to two (2) feet at top, R, and the length of fire-place, O, is four feet six inches (4' 6").

The ash-pit S is twelve (12) inches below fire-bars T, and extending to the back of fire-bars.

The outside walls, U, extend twelve (12) inches on each side beyond the outer arch C.

In constructing the fire-place, hearth, or sole and arches of my muffle-furnace, I use silex, clay, oxide of iron, common spar, and silicate of soda, in the following proportions:

Ten (10) pints silex, two (2) pints of clay, one (1) pint oxide of iron, two (2) pints common spar, and one (1) pint silicate of soda.

I do not confine myself to these proportions, but use the silicate of soda, according to the nature and composition of the clay and other materials in the construction of my muffle-furnace; and, in order that my furnace may become dry in an uniform manner, I inject steam until the whole is brought to 212°. I then apply a gentle heat, until the whole becomes perfectly dry. It is then fit for use.

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

A muffle-furnace, for the oxidation of sulphurated ores and chlorination of the precious metals, by the use of slides or valves, whereby the admission or exclusion of air can be governed, substantially as herein set forth.

Also, the use of silex, clay, oxide of iron, common spar, and silicate of soda, in the construction of muffle-furnaces

Also, the mode of drying by steam, all of which is herein substantially set forth.

HENRY H. EAMES.

Witnesses:

EDM. F. BROWN,  
CHARLES S. EAMES.