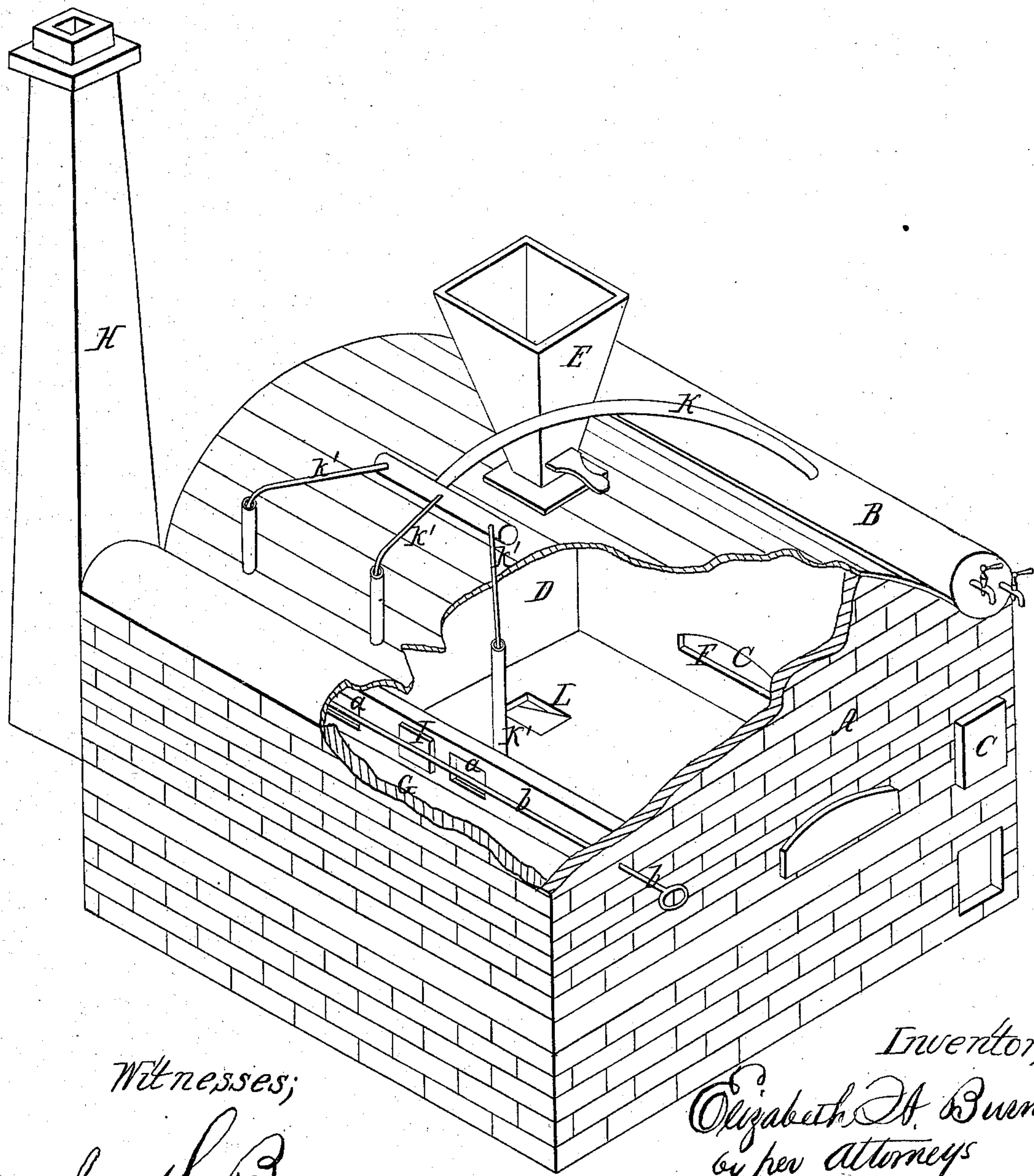


*E. A. Burns*

*Roasting Ores.*

*N<sup>o</sup> 100,497.*

*Patented Mar. 8, 1870.*



*Witnesses;*

*Wm. L. Boone  
Edw. P. Gray*

*Inventor;  
Elizabeth A. Burns  
by her attorneys  
Dewey & Co*



# United States Patent Office.

ELIZABETH A. BURNS, OF MEADOW LAKE, CALIFORNIA.

Letters Patent No. 100,497, dated March 8, 1870.

## IMPROVEMENT IN DESULPHURIZING ORES.

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, ELIZABETH A. BURNS, of Meadow Lake, county of Nevada, State of California, have invented an improved Method and Process for Disintegrating and Desulphurizing Rock, Ores, and Sulphurets; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention or improvements without further invention or experiment.

My invention relates to an improved method and process of treating rocks, and more especially ores and sulphurets which contain the precious metals, for the purpose of desulphurizing and disintegrating them, in order to render them capable of being easily separated, and to render the metals contained in them capable of amalgamation and extraction.

My process is particularly adapted to that class of ores known as rebellious ores, which cannot be worked in the ordinary manner of working ores, owing to the peculiar chemical combination of which they are composed; and

It consists, first, in subjecting the rock or ores to a heating and burning-process in a peculiarly-constructed furnace; and, secondly, in placing the rocks or ores, after burning, in a solution prepared to receive it, by which it is thoroughly desulphurized, and the cohesion of the particles destroyed, setting free the free gold, and leaving the remaining portion in such a state that it is capable of easy reduction and amalgamation.

Referring to the accompanying drawings and letters marked thereon for a fuller description of my furnace and the method which I employ—

A is a furnace of any suitable external form or shape.

B is a boiler filled with water, and is placed in the brick-work of the furnace, directly over the fire-place C.

The fire is built underneath the furnace and boiler, and the rock or ore is passed into the chamber D, through the hopper E, where it remains until it is thoroughly roasted, which will generally be accomplished in twenty-four hours.

The smoke and heat from the furnace pass up through the opening F in the side of the chamber D, beneath the boiler, and into the ore-chamber, where it aids in roasting the rock.

On the opposite side of the furnace from the boiler is a covered way, G, which is separated from the ore-chamber by a partition, through which draught-openings *a a* are made, and through which the smoke passes on its way to the chimney H.

These openings may be closed or the draught regulated by dampers I, which are attached to a rod, *b*,

which extends through the side of the furnace, by sliding which back and forth the draught-openings can be closed, or partly closed, as desired.

Rising from the boiler B is a steam-pipe, K, which leads directly across the top of the furnace, and branches out into a number of pipes, K' K' K', equal to the number of draught-openings *a*. These pipes descend through the top of the furnace, and terminate, one just above each of the openings *a*, so that a constant jet of steam plays directly across the openings upon the bottom of the ore-chamber, and prevents any waste of the metals by evaporation, or by being carried off by the draught.

This principle can be applied in various places where metals are being subjected to a great heat, and it will be found to be a complete guard against evaporation or waste of the metals, which are inclined to be drawn up the chimney by the draught.

In the bottom of the ore-chamber is an opening, L, which extends to the outside of the furnace on an inclined plane, and through which the ore is drawn off after roasting.

Thus far I have explained the first part of my method or process for desulphurizing and disintegrating rocks and ores, which differs from the usual method of roasting only in the form and arrangement of the furnace, and the use of a jet of steam for settling any light particles of metal which are inclined to be drawn off by the draught.

It is essential in working ores by my method, that the rock or ores should be thoroughly calcined, in order that all the volatile parts shall be driven off.

The second part of my method or process consists in plunging the calcined ore into a bath or solution, which completes the work of disintegration, leaving it in a form or quality resembling ashes, and in a fit state for separation.

This solution consists of the following ingredients, calculated on forming one gallon:

Salts Tartar, (carbonate of potassa,) one-fourth ( $\frac{1}{4}$ ) ounce.

Salts of soda, (carbonate of soda,) one-half ( $\frac{1}{2}$ ) ounce.

Borax, (biborate of soda,) one (1) ounce.

Common ley, (potash,) two (2) quarts.

Concentrated ley, three (3) pints.

Chamber ley, one (1) pint.

These ingredients are mixed in about the proportions above designated, but the exact proportions cannot be given, as the solution is made stronger or weaker, according to the character of the ore. When the solution is not strong enough, the ore or sulphurets will require to be kept a longer time submerged.

This solution is kept in vats convenient to the discharge-spout leading from the furnace, and the heated



ore or sulphurets are run directly into it from the chamber, in which it is permitted to remain the same length of time which it has been under the action of the fire.

After the calcined ore or sulphurets have remained a sufficient length of time in the solution, the solution is drawn off into an adjoining vat, which leaves the ore in a perfectly disintegrated state, and much resembling wood ashes, the particles of gold being set free; after which, by the usual processes of treating pulverized ores, the gold or other metal can be separated from the gangue or matter with which it is mixed.

By this process ores of the most refractory nature can be treated without crushing, and the gold, after being subjected to the above process, will amalgamate very freely, when, in fact, it would refuse to be acted upon by mercury when treated in the ordinary method.

Having thus described my invention,

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

1. The use of a jet of steam passing across the draught-openings *a*, for the purpose of preventing waste of the metals by evaporation, or by being drawn off by a draught, substantially as herein set forth.

2. A bath, for the purpose specified, compounded of the ingredients named in the foregoing specification, in about the proportions specified.

In witness whereof I have hereunto set my hand and seal.

ELIZABETH A. BURNS. [L. s.]

Witnesses:

A. F. BLOOD,  
ROBERT BURNS.