

# United States Patent Office.

WILLIAM BRÜCKNER, OF CENTRAL, COLORADO TERRITORY.

Letters Patent No. 92,009, dated June 29, 1869.

## IMPROVED PROCESS OF ROASTING AURIFEROUS SULPHURETS.

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, WILLIAM BRÜCKNER, of Central, Gilpin county, Colorado Territory, have invented certain new and useful Improvements in the Process for Roasting Auriferous 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.

The nature of my invention and improvements consists in the use, in a particular manner, and for special purposes, to be herein described, of common salt, or other substance yielding chlorine and lime, in the roasting of auriferous sulphurets, to prepare them for the process of amalgamation.

Experience has shown, that by the roasting-processes heretofore in use, not more than from fifty to sixty per cent. of the gold contained in these ores has been obtained from them by amalgamation, and that proportion only from the best sort of iron sulphurets, while from the more refractory ores, such as those of Colorado, and particularly those that have not been exposed to the decomposing-action of the atmosphere, often not more than from twenty-five to thirty per cent. of the gold has been obtained.

At the same time there has been a great loss or waste of quicksilver, from its becoming coated, or converted into calomel, or "floured," in which state it has no affinity for gold, and does not combine with it.

Now, the low yield of gold, as above stated, I have found to be owing to two causes: first, a coating formed on the gold in the ordinary process of roasting the ore, and second, the destruction of the amalgamating-capacity of the quicksilver by the sulphates, chlorides, or other products of the roasting-process.

For both these causes, my improvement is found to be an efficient remedy, and so complete, that by using it, nearly all the gold may be extracted from the most refractory ores, or at least eighty or ninety per cent. thereof, by amalgamation.

I will now describe my improved process.

The auriferous sulphurets are to be finely pulverized and the roasting-furnace charged. The ore should be constantly stirred, and the heat raised until the sulphur begins to burn and escape through the chimney, but should then be raised no higher till the sulphur is burned off. After that has been effected, a strong heat should be put on, and charcoal or sawdust may be advantageously added, to deprive the base metals, commonly contained in the ore, of the last atoms of sulphur or sulphur-acid.

This operation is called dead-roasting, and all the gold is now set free, except that it will be found to be more or less coated, according to the amount of copper, lead, or other base metal contained in the ore.

From one-half, of one per cent. to five per cent. of the chloride of sodium (common salt) must now be added, according to the richness of the ore and the character of its base metals.

Through the high heat to which it is subjected, in contact with the silicious and other matter in the ore, chlorine is evolved from the salt, and acting on the coating of the gold, forms chlorides of the base metals, and leaves the gold clean and bright, and perfectly susceptible of amalgamation.

For this process or operation, about half an hour is sufficient.

If the ore treated as above was one of the purer sort of iron sulphurets, containing no lead, copper, or other such base metal, or only very small proportions thereof, the ore is now ready for amalgamation, no considerable amount of the chlorides of these metals having been formed, to injure the quicksilver by converting it into calomel, or causing it to "flour."

But if the base metals above referred to were present in the ore in any considerable quantities, which may be ascertained by an examination of the particles of gold before the application of salt, then carbonate of lime, burnt lime, or some equivalent, must be added, to prevent the chlorides of these metals, formed by the use and decomposition of the salt, from acting upon and injuring the quicksilver, as already described.

By this means the lime, or a portion of it, is converted into chloride of lime, and the metals aforesaid into oxides, which have no injurious effect upon the quicksilver.

No more lime should be used than what may be required for the decomposition of the chlorides. From one to three per cent. I have generally found to be sufficient; but if a proper test indicates still the presence of the chloride of copper, or of any other base metal, more lime must be added, till all traces of these chlorides are removed. From half an hour to one hour is commonly sufficient for this part of the process.

I also contemplate the application of chlorine-gas, previously prepared, in place of the compound chloride of sodium.

Having thus described my improved process, it is to be understood that I do not claim as new the use of salt and lime in roasting ores; but

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

The use and application of these materials, in a particular manner, and for special purposes, substantially as set forth in the foregoing specification.

WILLIAM BRÜCKNER.

Witnesses:

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