

# UNITED STATES PATENT OFFICE.

GEORGE W. MCGEE, OF CHICAGO, ILLINOIS.

## PROCESS OF TREATING GOLD AND SILVER ORES.

SPECIFICATION forming part of Letters Patent No. 487,579, dated December 6, 1892.

Application filed July 24, 1891. Serial No. 400,593. (No specimens.)

*To all whom it may concern:*

Be it known that I, GEORGE W. MCGEE, of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved  
5 Process of Treating Gold and Silver Ores, of which the following is a full, clear, and exact description.

My invention relates to improvements in the process of treating gold and silver ores; and the object of my invention is to produce  
10 a simple and comparatively-inexpensive process which will render refractory and other ores free milling and which will prevent the gold or silver from volatilizing during the  
15 process of reduction.

To this end my invention consists in a process which will be hereinafter described and claimed.

The ores to be treated are first ground to  
20 pulp in the ordinary way and then dried, or they may be crushed dry. The crushed and dried ore is then placed in a suitable vessel capable of withstanding heat and the mass is covered with a ten per cent. solution of caustic  
25 soda or potash. The mixture is then heated, and while hot salts of oxalic acid and sulphate of copper or blue-stone are added, there being about one ounce of salts of oxalic acid and one-half ounce of sulphate of copper  
30 or blue-stone to each gallon of the caustic-soda or potash solution. The entire mass is subjected to heat until all the liquid has evaporated, and it will be found that the ores will be completely disintegrated and the precious  
35 metals will be left in a free state, ready to be easily extracted by the ordinary quicksilver amalgamation process.

It will be understood that while the proportions of the mixture stated are adapted for  
40 average ores yet the proportions of the mixtures may be greatly varied, according to the character of the ores to be treated—for instance, in some cases a larger or smaller amount of the oxalic acid would be used and the sulphate of copper or blue-stone might be  
45 dispensed with.

The reactions are as follows: The caustic

soda changes the pyrites to ferrous and ferric hydrate, which in turn are reduced to ferrous and ferric oxalate. The caustic soda changes  
50 the proustite to silver-sodium arsenate and sodium sulphide. The arsenate then changes (on addition of the oxalic acid) to arsenic-sodium oxalate. The caustic soda attacks the quartz, giving sodium silicate, which on addition  
55 of the oxalic acid changes to an oxalate of sodium and silicon, whose composition has not yet been satisfactorily determined.

In the process described the solution prevents "mealing" of the mercury—*i. e.*, in  
60 amalgating the mercury becomes covered with a coating of sulphide chloride, &c., which prevents its rapid union with the metals.

By the above-described process the gold is freed in its metallic form, so that it can be  
65 obtained by the ordinary process of amalgamation.

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

1. The herein-described process of treating ores, which consists in crushing the ore, submerging the crushed ore in a solution of caustic  
75 soda or potash, heating the mixture, and adding to the heated mixture salts of oxalic acid and sulphate of copper or blue-stone.

2. The herein-described process of treating ores, which consists in crushing the ore, submerging the crushed ore in a solution of caustic  
80 soda or potash, heating the mixture, adding to the mixture salts of oxalic acid and sulphate of copper or blue-stone, and evaporating the liquid from the mixture.

3. The herein-described process of treating ores, which consists in crushing the ore, submerging the ore in a solution of caustic  
85 soda or potash, adding to the mixture salts of oxalic acid, and evaporating the liquid from the mixture.

GEORGE W. MCGEE.

Witnesses:

WARREN B. HUTCHINSON,  
E. M. CLARK.