

# United States Patent Office.

HENRY JANIN, OF VIRGINIA CITY, NEVADA.

Letters Patent No. 87,340, dated March 2, 1869.

## IMPROVED PROCESS OF WORKING SILVER-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, HENRY JANIN, of Virginia City, county of Storey, State of Nevada, have invented a new and improved Process for Working Silver-Ores; and I do hereby declare that the following is a full, clear, and exact description of said process, together with full instructions for performing the same, and the names and quantities of the ingredients used in the various workings and tests through which the ore is put, to produce and economize the production of silver.

In the current workings of silver-ores, whether in pans, barrels, or amalgamating-tubs, it is customary to use, in addition to quicksilver, a mixture of common salt, ( $\text{Na Cl}$ ) and sulphate of copper, ( $\text{CuO}$ ,  $\text{SO}_3$ ) in variable proportions and quantities.

These ingredients react upon each other, with the formation of sulphate of soda, ( $\text{NaO}$ ,  $\text{SO}_3$ ) which is without any action in the process, and protochloride of copper, ( $\text{Cu Cl}$ ) which is the active agent in converting the sulphide of silver ( $\text{Ag S}$ ) into the chloride, ( $\text{Ag Cl}$ ) in which state it is more easily reduced by iron or quicksilver, and taken up by the latter metal.

This process has the following serious defects:

The quicksilver is attacked by the protochloride of copper, and partially converted into calomel, ( $\text{Hg}_2 \text{Cl}$ ) thus causing a chemical loss of this metal. At the same time, by covering each particle of quicksilver with a thin coating of calomel, this metal is "sickened" and "deadened" to such an extent as to "flour" it, and to prevent, in a measure, the running together and collection of all the particles when the ore is being settled and washed. Thus, a mechanical loss is incurred, in addition to the chemical loss caused by the formation of calomel.

In case of rebellious ores, and when sufficient sulphate of copper and salt is used to convert the sulphuret of silver into the chloride, the loss in quicksilver becomes very serious, and may amount to ten (10) pounds, or more, per ton of ore treated, and thus becomes such a source of expense as to put a stop to the profitable treatment of poor ores or tailings.

In addition to the loss of quicksilver, the yield in silver is lessened, and the amalgamating-power of the quicksilver is reduced by the coating of calomel.

To avoid this loss in silver and in quicksilver, I make use of the dichloride of copper, ( $\text{Cu}_2 \text{Cl}$ ) which I ap-

ply to the ores, tailings, or slimes, and, whether worked in pans, barrels, or tubs, dissolved in a solution of common salt.

The dichloride of copper has no action upon the quicksilver, whether chemical or mechanical, and I thus avoid all the loss of quicksilver, due to the use of the salt and sulphate of copper, which produce the protochloride of copper; at the same time the yield of silver is increased, as I have proved by direct comparative experiments.

The dichloride of copper is insoluble in water, and the object of dissolving it in a solution of common salt, is simply to multiply the points of contact between the reagent and the particles of ore to be reduced.

The same purpose is served if the salt be added to the ores, tailings, or slimes, in the pans, barrels, or amalgamating-tubs.

I do not restrict myself to any particular quantity of the reagent and dichloride of copper to be used per ton, as this must vary with the richness or more or less rebellious nature of the ores, tailings, or slimes to be treated.

I prepare the dichloride by any of the known methods, either apart from the ores, tailings, or slimes to be worked, or in the presence and during the treatment of the ores, tailings, or slimes, in pans, barrels, or amalgamating-tubs, by the addition of the appropriate and necessary chemical ingredients.

I do not claim the use of salt in my process, as this has been and is in current use; but

What I do claim, is—

The use and application of the dichloride of copper, ( $\text{Cu}_2 \text{Cl}$ ) in the treatment of all classes of silver-ores, tailings, or slimes, whether worked in pans, barrels, or amalgamating-tubs, and whether the dichloride of copper be made outside and apart from the ores, or whether it be made in the presence and during the treatment of the ores, tailings, and slimes, by the introduction, into the pans, barrels, or amalgamating-tubs, of the appropriate and necessary chemical ingredients.

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

HENRY JANIN. [s.]

Witnesses:

LEON McL. BALDWIN,  
LOUIS JANIN, Jr.