

In the case of arsenical copper or antimonial ores the solution is poured off or drained away from the ore, which is then leached with water to remove any excess of the chemical solution remaining therein. One washing is usually sufficient. These ores are then ready for treatment by amalgamation with quicksilver to collect the precious metals in any usual manner on plates, in barrels, or pans.

It will be found that the dissolution of the arsenical, cupric, and antimonial compounds by my aforesaid preliminary treatment much enhances the ease and efficiency of the usual treatment by amalgamation, preventing the flouring or sickening of the mercury employed in the said amalgamation, and giving increased extraction. In the case of the ordinary ores, or ores containing chiefly iron-pyrites and without arsenical or antimonial compounds, my solution decomposes the sulphides of iron, and such ores, after treatment with my solution, and standing as aforesaid, may be passed at once to the amalgamating-pans, barrels, or plates without draining off the solution or washing unless it is desired and practicable to again use the solution.

The total amount of my solution used in each case will vary according to the refractory or rebellious character of the ores, but may always be used in excess, in which case the partially-exhausted solution can be refortified and used again.

In the absence of carbonate of soda, soda crystals (common washing-soda) may be used in my solution with equal effect, care being taken that the necessary amount of carbonate of soda be present.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is,—

1. A preliminary treatment before amalgamation of gold- or silver-ores with a mixed solution of alkaline hydrates and alkaline carbonates.

2. A treatment of gold- or silver-ores before amalgamation, consisting of the boiling of the crushed ore for at least one hour in a solution of mixed alkaline hydrate and carbonate, such as caustic soda and carbonate of soda, and the after-digesting of the ore for at least twenty-four hours in said solution, substantially as described.

3. The washing and draining-off of the solution from the ore sludge of arsenical, cupric, or antimonial ores after boiling and digesting before passing same to amalgamation, substantially as described.

4. The composition of the solution for a preliminary treatment of gold- and silver-ores, consisting of equal parts by weight of alkaline hydrate and carbonate, such as 5 per cent. of caustic soda and 5 per cent. of carbonate of soda, with 90 per cent. of water, substantially as described.

Dated this 14th day of October, 1896.

KATE ALBERTA MAY.

AN IMPROVED MACHINE FOR USE IN THE EXTRACTION OF GOLD FROM AURIFEROUS MATERIAL BY THE AID OF CHEMICAL SOLVENTS.

I, Joel James Deeble, of Rae Street, Bendigo, in the Colony of Victoria, metallurgist, do hereby declare the nature of my invention for "An Improved Machine for Use in the Extraction of Gold from Auriferous Material by the Aid of Chemical Solvents," and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention has been devised in order to provide a machine for use in the extraction of gold from auriferous material by the aid of chemical solvents, in order to insure the particles of auriferous material being brought into intimate contact with the cyanide or other solvent solution.

It consists of a vat or pan to receive the auriferous material to be treated having at or about its centre a vertical shaft or spindle with one or more agitators or stirrers attached to its lower end. Motion is imparted to this shaft or spindle by bevel gearing or other convenient mechanical contrivances, and means are provided for reversing the rotation and controlling the speed of the agitators, as well as for raising or lowering the agitator shaft or spindle. These means may consist of a screw-threaded lifting-rod fitted with a correspondingly threaded bevel wheel, in gear with a bevel pinion fitted with a crank-handle, whereby it may be rotated in the required direction, or, if preferred, a rack and pinion may be used for the purpose.

The inner side of the wall of this vat or pan is provided with a series of projections which produce eddies or swirls in the material under treatment as it is carried round the vat or pan.

In order to drain or draw off the gold-bearing solvent from said vat it is provided with a vertically-sliding valve, or, if preferred, a pipe or pipes might be used for this purpose. A waste discharge-valve may also be provided in the lower part of the vat or pan for the purpose of enabling the waste material to be sluiced therefrom after the gold has been dissolved and the gold-bearing solution has been drawn off through the valve above referred to.

The accompanying drawings will more clearly illustrate the construction and arrangement of my improved machine: Figure 1 represents a vertical central section of said machine; Figure 1a, a plan of part of the driving-gear; Figure 2, a side elevation of said machine; Figure 3, a sectional elevation; and Figure 4, a plan of a vat drawn to a smaller scale; Figure 5 is a side elevation of the vertically-sliding valve above referred to; Figure 6 is a plan thereof; Figure 7 is a horizontal section on line 7-7, Figure 5; Figure 8 is a vertical central section on line 8-8, Figure 5; and Figure 9 is a side elevation of said valve.

The same letters of reference indicate the same or corresponding parts in all the figures. A represents a vat to contain the auriferous material to be treated, while B represents the vertical spindle which is provided in or about the centre of said vat, and which carries the agitators or stirrers C on its lower end. These latter consist by preference of projecting bars or arms, as shown, and they may be attached at their inner ends to a casting c' on the lower end of the spindle B, which is preferably made square, or otherwise sided in cross-section, and is passed