

"Having now particularly described and ascertained the nature of the said invention, and in what manner the same is to be performed, we declare that what we claim is: the process of obtaining gold and silver from ores and other compounds consisting in treating such ores or compounds with cyanogen, or a cyanide, or other substances or compounds containing or yielding cyanogen, substantially as specified."

In their specification lodged in America there is a considerable difference. They state the maximum proportions of cyanogen to the quantity of water, and their letters patent do not admit of their laying claim to any substance and compound yielding or containing cyanogen. It is, however, clearly shown in the late action that their invention is no invention of theirs at all, but merely the outcome of other people's brains who had previously studied the subject more than twenty years prior to their application for a patent to use cyanide of potassium in extracting gold and silver from ores. It does appear strange, at first sight, that letters patent should ever have been issued to them in this colony for the use of any substance or compound containing or yielding cyanogen. The claim is so broad that it practically shuts out any one from experimenting with any compound containing cyanogen with the view of improving the method of extracting precious metals from their ores.

The general opinion amongst mining men in this colony is, at the present time, that for certain ores the cyanide-of-potassium process is the most efficacious, combined with economy, that has yet been introduced here; but the royalty hitherto charged by the Cassel Company, which may be said to vary from 5 per cent. to $7\frac{1}{2}$ per cent. of the value of all the bullion recovered by that process, is by far too high, and has prevented many from using it as freely as would be done otherwise. No one would have grudged to pay a small royalty for the use of the process and the trouble the Cassel Company took in introducing it into the colony, but still that company should only have been entitled to receive royalty on a certain specified method of applying the cyanide of potassium, and not for the use of a chemical which has been known for many years to have solvent properties for gold and silver. Now that the question has been practically settled, the question of applying this chemical for extracting gold and silver from their ores may receive more attention, and improvements are more readily to be made in the process.

The use of Zinc as a Precipitant.

There is still another question in relation to the extraction of gold and silver from cyanide solutions which may come up—that is, the use of zinc as a precipitating agent. Messrs. MacArthur and Forrest also hold letters patent for the use of this agent; but if it is held that they are not entitled to a patent for the use of cyanogen for extracting gold and silver, on the grounds that it is no new invention, their patent for the use of zinc as a precipitant is equally bad. Jerome W. Simpson, in applying for his patent for the use of a solution of cyanide of potassium, states distinctly that he does not claim the use of zinc as a precipitant, and admits its prior use in 1885.

On the 29th April, 1884, letters patent were granted to Astley Paston Price, of London, for certain improvements in the extraction of precious metals from their ores, covering the use of zinc as a precipitating agent. Mr. Price claims as follows: "I wish it to be distinctly understood that I do not claim as any part of my invention the methods or processes for effecting the solutions of the gold or of the silver when contained in ores or metallurgical compounds or products; but what I do claim is effecting the precipitation of the precious metals—*videlicet*, of gold and silver—resulting from the treatments subsequently, as hereinbefore mentioned, or otherwise, of ores or metallurgical products, such as are similar to those hereinbefore referred to, by the employment, when in a fine state of division, of zinc, or other metal or metals other than copper, which are capable of precipitating gold or silver, the same being brought in contact with the solution."

Having shown thus far that zinc was known as a precipitating agent in 1884, and that letters patent were issued to Mr. Price, we find that on the 1st February, 1888, Messrs. MacArthur and Forrest applied for letters patent in this colony, when they described their invention as follows:—

"One improvement consists in preparatorily treating or mixing the powdered ore or other compound with potash or lime or other alkali or alkaline earth which may be allowed to remain with the ore or compound, or which may be washed out if soluble. In some cases, as, for example, when mercury-cyanide is used, it is advantageous for the alkali or alkaline earth to remain.

"After this preparatory treatment, the ore or compound, which may consist of tailings or residues from other processes or operations, may be treated as described in our earlier specification hereinbefore referred to. We prefer, however, to cause the cyanide solution to percolate through the materials once or oftener until all, or nearly all, the precious metals are dissolved. For this percolation very simple tanks, vats, or vessels may be used, such vessels being provided with permeable false bottoms or any suitable filtering apparatus.

"The separate solution is next made to pass through a mass of metallic zinc in a state of fine division. We find that the best results are obtained in this part of the process when the zinc has been freshly divided by mechanical or other means so that its surfaces are as purely metallic as possible, and, further, when the quantity or mass of zinc employed is such that the solution has, in passing through it, ample opportunity for being thoroughly acted on.

"This improved zinc process is also advantageously applicable with other than cyanide solutions containing the precious metals—that is, with solutions such, for instance, as chlorides, bromides, thio-sulphates (sometimes called hypo-sulphites), or sulphates, obtained in the well-known Plattner, Von Paterna, Russell, Ziervogel, and Augustine extracting processes. We preferably employ cast-zinc, and this is reduced to the requisite fine state of division by any suitable means. The degree of division is preferably such as would be obtained by shaving or cutting pieces of a cake of zinc, of from $\frac{1}{4}$ in. to $\frac{1}{2}$ in. in thickness, by means of a circular saw, and this is the method in which we prefer to reduce same, but, instead of such method, molten zinc may be caused to pass through the meshes of a fine sieve, and to fall into water. In order to obtain the best results, the finely