

UNITED STATES PATENT OFFICE.

JOHN COLLINS CLANCY, OF NEW YORK, N. Y.

TREATMENT OF ORES BEARING PRECIOUS METALS.

955,318.

Specification of Letters Patent.

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No Drawing.

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To all whom it may concern:

Be it known that I, JOHN COLLINS CLANCY, a subject of the King of Great Britain, having declared my intention of becoming a citizen of the United States, at present residing at New York city, borough of Manhattan, in the county of New York and State of New York, have invented certain new and useful Improvements in the Treatment of Ores Bearing Precious Metals, of which the following is a specification.

My invention relates to novel methods of treating ores bearing the precious metals, which methods are particularly described and pointed out in the following specification and claims.

I have discovered that the precious metals may be advantageously recovered from ores containing them, whether such ores be rebellious or non-rebellious, by the use of a cyanid solution containing a soluble iodid and a suitable substance capable of yielding nascent oxygen in said solution. In the case of rebellious ores—those containing, for example, reducing agents, or tellurium, or both—no preliminary treatment, such as roasting, is required.

One way of carrying my invention into practice, whether reducing agents and tellurium be or be not present, is to treat the pulverized ores simultaneously with a cyanid solution—such, for example, as potassium cyanid—a soluble persulfate—such, for example, as the sodium or ammonium persulfates—and iodin or a soluble iodid—such, for example, as potassium iodid. The desired result is prevented if the solution be substantially acid, although it will take place if the solution be neutral or alkaline or only slightly acid. Such a solution I call a substantially non-acid solution. The strength of the solution is, to some extent, dependent upon the character of the ore to be treated, and it must, therefore, be ascertained by preliminary tests; but in practice with certain ores such as I have treated, I have found the following proportions to answer well the purposes of the process: a solution containing one pound potassium cyanid, one-half pound potassium iodid, three pounds sodium persulfate and one-half pound of lime or soda dissolved in two thousand pounds of water in the proportion of two parts of the above named solution to one part of ore. The same solution can be

used again and again by keeping up the requisite strength in cyanid and sodium persulfate, but no further addition of potassium iodid is necessary, except to compensate for mechanical losses, as the persulfate regenerates the iodin to begin its work over again. Between each operation it is desirable to pass the liquor through zinc shavings in the ordinary way to extract the values which it contains.

Another way of carrying my invention into practice, effecting the solution of the precious metals, whether reducing agents and tellurium be or be not present, is to treat the pulverized ore simultaneously with a cyanid solution—such, for example, as potassium cyanid—, iodin or a soluble iodid—such, for example, as potassium iodid—and ozone. In practice with certain ores I have treated, I have found the following proportions to answer well the purposes of the process: a solution of one pound of potassium cyanid, one-half pound potassium iodid, and one-half pound of lime or soda, dissolved in two thousand pounds of water in the proportion of two parts of said solution to one part of ore. The amount of ozone to be passed into the solution—with or without the admixture of air—is to be determined by titration or otherwise. In practice I have found that a proportion equivalent to two hundred grams of ozone to two thousand pounds of solution gave good results, although with some ores as little as fifteen grams of ozone to two thousand pounds of solution have given excellent results. In this case also the ozone regenerates the iodin to begin its work over again. Hence, no further addition of potassium iodid is necessary except to compensate for mechanical losses.

Another way of carrying my invention into practice is to substitute in the above example nitrogen oxid—such, for example, as nitrogen peroxid—for the ozone there used. Here, again, the peroxid of nitrogen regenerates the iodin as in the other examples. As I have said, it is not necessary in practicing the above processes with rebellious ores—those containing, for example, reducing agents (sulfids of iron, etc.) or tellurium, or both—to roast the ore, since the sulfids do not act on the solution to decompose it, and the tellurium is dissolved simultaneously with the precious metal. In-

stead of applying said oxidizing agents to the solution in the presence of the ore being treated, they might be, although less advantageously, applied to the solution after it
5 has been separated from the ore, or between successive treatments of ore.

The cost of iodine in a commercial process would be prohibitive were it not for the fact that in the processes above described the
10 iodine is repeatedly regenerated and does the same work over and over again. Its action may be likened to that of a vehicle or carrier and hence it is not substantially consumed.

15 Having thus described my invention and examples of different ways of carrying it into effect, it will be understood that various modifications and changes in the described processes may be made, and equivalent substances may be employed, without departing

from the spirit of my invention and without exceeding the scope of my claims.

What I claim is:—

1. The process of treating pulverized ore containing precious metals which consists in
25 subjecting said ore to the action of a cyanid solution, a soluble iodide and a substance capable of yielding nascent oxygen in the presence of said solution.

2. The process of treating pulverized ore
30 containing precious metals which consists in subjecting said ore to the action of a cyanid solution, a soluble iodide and ozone.

In testimony whereof I have signed my name to this specification in the presence of
35 two subscribing witnesses.

JOHN COLLINS CLANCY.

Witnesses:

WM. GOLDBURG,

WM. H. HARDING, Jr.