

UNITED STATES PATENT OFFICE.

LOUIS M. PRITCHARD, OF BOISE, IDAHO.

PROCESS OF TREATING ORES.

No. 861,535.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, LOUIS M. PRITCHARD, a citizen of the United States, and a resident of Boise, in the county of Ada, State of Idaho, have invented certain new and useful Improvements in the Processes of Treating Ores, of which the following is a full and exact description, such as will enable those skilled in the art to which it appertains to practice the same.

The great advance made in recent years in the art of reducing base and low grade ores has made such ores very valuable. The ordinary methods used by prospectors in the field for testing ores are not well adapted to the testing of ores generally, but more especially base and low grade ores. To ascertain the value of his samples it is usually necessary for the prospector to send them to an assayer, who is often located at a distant point, and to have a reliable report numerous assays are required. This method is not only costly but requires considerable time in sending the samples and waiting for the returns.

The present invention has for its object the provision of a process whereby the prospector himself can make the tests of his ores for gold in the field, make as many as he desires, and do so at very great saving of expense and time; and also by means of which he can arrive at a fair approximation of the gold value of his ores. The process is only adapted to the testing and reduction of auriferous ores and will be described as so applied.

It is well known that the elements of the halogen group are solvents of gold, and of these, iodine is the most stable, has the least affinity for hydrogen, dissolves fewer substances other than gold, and is least liable to injuriously affect those who handle it. In the present invention it is proposed to take advantage of the properties of iodine in a process for treating auriferous ores, particularly for assaying purposes. Iodine mixed with potassium iodide can be easily carried by the prospector as a part of his outfit as dry salts, to which he can add water to make the solvent solution when he desires to use it, thus being able to carry a large amount of the solvent in a small bulk and much more safely than any liquid solution; the other agents necessary for carrying out the process he ordinarily carries with him.

The process consists in treating the ore with a solution of iodine to dissolve the gold and adding mercury to the solution to form an amalgam and then separating the gold from the mercury.

In carrying out the process the ore is ground very fine and screened to remove the coarser particles. Previous to grinding most ores can be roasted to advantage, thus freeing the ore of most of the interfering elements, making it more porous, so that the gold is more easily leached out; some ores however, such as those containing galena, can be better treated without the preliminary roasting. The pulverized ore is treated

with an excess of a solution of iodine dissolved in potassium iodide in an aqueous solution. The solution is added until the mixture retains a dark red color. While the ore is being acted on by the solvent the grinding can be continued at intervals to remove any slimes or precipitates that may coat the particles and thereby permit the solution to act directly upon the gold particles. After the ore has been acted upon for a sufficient length of time, depending upon the quantity and fineness of the gold in the ore, the solution is separated from the pulp. To obtain all of the solution it may be washed from the pulp with water. After the solution has been separated from the pulp, mercury is added and the mixture is vigorously agitated until all of the red color of the solution disappears. If sufficient mercury has been added, and it is better that it should be too much rather than too little, the liquid gradually clears and the mercury flours and sometimes turns black, when all of the gold will be found amalgamated with the mercury. The mercury reduces the gold in solution to the metallic state and immediately forms an amalgam with it. The excess of iodine and potassium iodide in the solution, aids greatly in thus collecting the gold by its action upon the mercury principally by causing it to break up and flour during the agitation, thus exposing a very large surface of the mercury to act upon the gold in solution, causing its amalgamation very quickly. The amalgam is then washed to free it from the solution and other extraneous matter. Finally the gold and mercury are separated by distillation or by treating the amalgam with nitric acid to dissolve out the mercury and other impurities if any. It is preferable to dissolve with nitric acid for the reason that it leaves the gold in a pure state, and when small quantities are taken it will be in the shape of a small gold button, in convenient form to be measured or weighed.

While the process has been particularly described as being adapted to the use of the prospector, yet it can be used on a large scale for the commercial reduction of ore.

Having thus described my invention, what I claim and desire to secure by Letters-Patent is,

1. The process of treating ores consisting in dissolving the gold in the ore in a solution of iodine, adding mercury to the solution to form an amalgam, and separating the amalgam into its component parts.

2. The process of treating auriferous ores consisting in pulverizing the ore, treating it with iodine dissolved in an aqueous solution of potassium iodide to dissolve the gold, agitating the solution thus formed with mercury to form an amalgam with the gold, and separating the gold from the mercury.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

LOUIS M. PRITCHARD.

Witnesses:

ALFRED RATHBUN,

CHARLES L. LINGENFELTER.