

UNITED STATES PATENT OFFICE.

EDWARD H. DICKIE, OF BODIE, CALIFORNIA, ASSIGNOR OF ONE-THIRD TO
JAMES KANE, OF SAME PLACE.

PROCESS OF LEACHING ORES OR TAILINGS.

SPECIFICATION forming part of Letters Patent No. 656,395, dated August 21, 1900.

Application filed April 2, 1900. Serial No. 11,244. (No specimens.)

To all whom it may concern:

Be it known that I, EDWARD H. DICKIE, a citizen of the United States, residing at Bodie, county of Mono, State of California, have
5 invented an Improvement in Processes of Leaching Ores or Tailings; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in
10 the leaching of ores, tailings, and like material containing valuable precious metals in conjunction with a cyanid solution, and is especially designed for use in connection with such ores or tailings as contain base sub-
15 stances which will act upon the cyanid in the solution and render it unfit to dissolve the precious metals.

It consists in the employment of an agent having little or no affinity for the precious
20 metals, but which will readily unite with that portion of the base substance which would otherwise be attacked by the cyanid and render the latter useless as a dissolving agent for gold and silver.

25 In leaching ores or tailings which contain lead, zinc, copper, and certain pyrites of these or of iron by what is known as the "MacArthur-Forrest" process of cyanid leaching or other kindred processes the base metals or
30 substances are acted upon by the cyanid in the solution, and entering into the solution they render it unfit to dissolve the precious metals. The solution is then in the condition known as "fouled" solution. As the base
35 substances uniting with the cyanid destroy its power of dissolving the gold and silver for which it is normally intended, it thus becomes neutralized and of no effect by reason of this combination. I have discovered that
40 acetic acid neutralized with lime in the cyanid solution or potassium acetate used directly in the solution while having little or no affinity for the precious metals will readily unite with that portion of the base metals
45 or substances which would otherwise be attracted by the cyanid. I have found by using the potassium acetate direct in the cyanid solution I obtain equally-good results as when acetic acid and lime or other equivalent agent

is used to neutralize the acid, the potassium 50 acting as a carrier for the acid and neutralizing it so far as any effect that it would have upon the cyanid is concerned, but leaving it free to unite with the base substances—such as lead, zinc, copper, &c.—previously men- 55 tioned and forming acetates of these. This addition also assists in precipitating the gold and silver on the zinc shavings or sponge which is employed in the cyanid process for that purpose, because the acetic acid or ace- 60 tate combined with the cyanid solution acts to prevent the deposit of the base metals on the zinc shavings, and, furthermore, that the action of the acetate upon the zinc keeps it clean and in good condition to receive the deposit 65 of gold and silver. It also acts to prevent the fouling of the cyanid solution by the presence of foreign matter in an organic state—such as dead leaves, decomposed wood, and vegetable matter—which is often unavoidably in- 70 troduced into the vats.

While the proportions used in my solution must necessarily vary with the character of the ore to be treated, I have found the following to be a very practical solution for gen- 75 eral mill use: potassium acetate, about one-fifth, by weight, of the amount of cyanid potassium used without regard to the strength of the solution, this being determined after the proper strength of solution is found for 80 the particular material which is to be leached.

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

1. The improvement in the process of leach- 85 ing ores or tailings with a solution which dissolves the precious metals, which consists in adding to the solution an agent composed of an acetate of an alkali metal or of alkali-earth metal which is capable of readily uniting with 90 and forming acetates of the base metals, and which has little or no affinity for the precious metals thereby enabling the solvent to act directly upon the latter, and then leaching the ores. 95

2. The improvement in the process of leaching ores or tailings with cyanid solutions, which consists in adding to such solutions an

agent composed of calcium acetate which unites with and forms acetates of the base metals thereby enabling the solution to act directly upon the precious metals, and then
5 leaching the ores.

3. The improvement in the process of leaching ores or tailings with cyanid solutions, consisting in adding to such solutions calcium acetate in proportions of approximately five

parts of potassium cyanid to one part of acetate, and then leaching the ores.

In witness whereof I have hereunto set my hand.

EDWARD H. DICKIE.

Witnesses:

JAMES KANE,

A. N. JONES.