

UNITED STATES PATENT OFFICE.

JOHN S. MACARTHUR AND CHARLES J. ELLIS, OF GLASGOW, SCOTLAND.

PROCESS OF EXTRACTING GOLD AND SILVER FROM ORES.

SPECIFICATION forming part of Letters Patent No. 555,463, dated February 25, 1896.

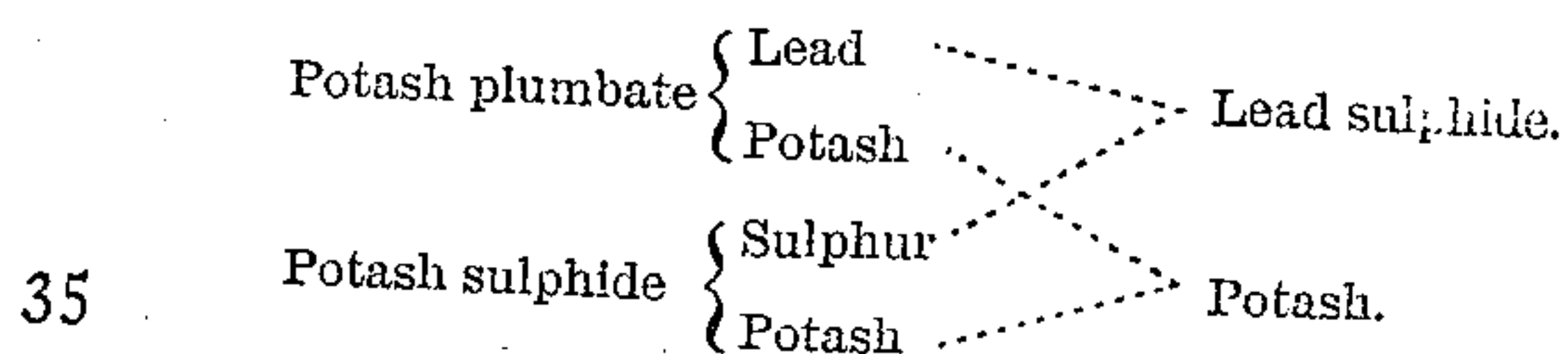
Application filed September 25, 1893. Serial No. 486,462. (No specimens.) Patented in England March 10, 1893, No. 5,218.

To all whom it may concern:

Be it known that we, JOHN STEWART MACARTHUR and CHARLES JAMES ELLIS, subjects of the Queen of Great Britain, residing at 157 West George Street, Glasgow, in the county of Lanark, Scotland, have invented certain new and useful Improvements in Extracting Gold and Silver from Ores and the Like, (for which we have obtained a British patent, No. 5,218, dated March 10, 1893,) of which the following is a specification.

Our said invention relates to what is known as the "MacArthur-Forrest Process" for extracting gold and silver from ores and the like by means of cyanides, and has for its object to increase the efficiency and economy of that process in cases in which, from the nature of the ores treated or other circumstances, it is found that in the solution of cyanide, as heretofore used, there is formed or becomes present a sulfide soluble therein which retards and objectionably affects the action of the cyanide on the precious metals.

The particular sulfide which may become present depends upon the base of the cyanide used. Thus if cyanide of potassium is used, sulfide of potassium may be formed. If cyanide of sodium is used, sulphide of sodium may be formed. The reaction which occurs may be represented as follows:



Our invention consists in removing or rendering inert such soluble sulfide by adding to the solution of cyanide or to the ore or to the mixture of ore and cyanide solution a suitable salt or compound of a metal which decomposes the soluble sulfide and unites with the sulfur thereof, forming a sulphide which is practically insoluble or inert in the cyanide solution, or which will materially diminish the objectionable action.

In carrying out our invention we may use any one or more of various metallic salts or compounds, of which the following may be

mentioned by way of example, preference being given to them in the order in which they are noted—namely, salts or compounds of lead, such as plumbates, carbonate, acetate, or sulfate of lead—or salts or compounds of other metals—such as sulfate or chloride of manganese, zincates, oxide, or chloride of mercury, and ferric hydrate or oxide.

The proportion of salt or compound to be used in any case will depend on the proportion of soluble sulfide which has to be dealt with in the cyanide solution applied to the particular ore, and the salt or compound will ordinarily be sufficient to unite with and render insoluble the sulfur of the soluble sulfides or so much thereof as would seriously impair the efficiency of the process if left in a soluble state. This quantity is easily and most conveniently ascertained by trials of a few small samples in each case in a manner which will be readily understood by those skilled in the art.

In the case of some ores containing sulfur we find that the addition of salts or compounds as and for the purpose hereinbefore referred to, and especially those of lead and mercury, increases the percentage of precious metals obtained.

We claim—

1. The process of separating precious metal from auriferous or argentiferous ore containing sulfur, which consists in subjecting the ore to the action of a cyanide solution, and precipitating by means of a metallic salt capable of combining with sulfur, any sulfur which may become soluble in the solution and thereby rendering it inert.

2. The process of separating precious metal from auriferous or argentiferous ore containing sulfur, which consists in subjecting the ore to the action of a cyanide solution and precipitating by means of a metallic compound capable of combining with sulfur, any sulfur which may become soluble in the solution and thereby rendering it inert.

3. The process of separating precious metal from auriferous or argentiferous ore containing copper, which consists in subjecting the ore to the action of a cyanide solution, and

precipitating by means of a salt of lead, any copper which may become soluble in the solution, and thereby rendering it inert.

4. The process of separating precious metal
5 from auriferous or argentiferous ore containing sulfur, which consists in subjecting the ore to the action of a cyanide solution and precipitating by means of a compound of lead

any sulfur which may become soluble in the solution, thereby rendering it inert.

JOHN S. MACARTHUR.
CHAS. J. ELLIS.

Witnesses:

GEO. A. ANDERSONE,
WM. NEILL.