

# UNITED STATES PATENT OFFICE.

MANUEL V. USLAR, OF GROSS-LICHTERFELDE, NEAR BERLIN, AND GEORG ERLWEIN, OF SCHÖNEBERG, NEAR BERLIN, GERMANY, ASSIGNORS TO SIEMENS & HALSKE AKTIENGESELLSCHAFT, OF BERLIN, GERMANY.

## PROCESS OF EXTRACTING GOLD.

SPECIFICATION forming part of Letters Patent No. 725,895, dated April 21, 1903.

Application filed June 17, 1901. Serial No. 64,955. (No specimens.)

*To all whom it may concern:*

Be it known that we, MANUEL V. USLAR, metallurgical engineer, a citizen of the Republic of Mexico, residing at 70 Dahlemerstrasse, Gross-Lichterfelde, near Berlin, and GEORG ERLWEIN, doctor of chemistry, a subject of the German Emperor, residing at 48 Gleditschstrasse, Schöneberg, near Berlin, Germany, have invented certain new and useful Improvements in Processes of Extracting Gold; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to the extraction of gold from auriferous ores by means of solutions of potassium cyanid.

Our new method for extracting gold from auriferous ores is especially suitable for ores containing antimony and arsenic and which are known as "rebellious" ores. It can, however, also be applied to any other auriferous ore.

Our invention consists in lixiviating auriferous ores with a solution of potassium cyanid containing hyposulfites or rhodanids. Also a mixture of hyposulfites and rhodanids may be added to the solution of potassium cyanid. Of the rhodanids and hyposulfites we have found those of the alkalis the most suitable. The operator will choose the substances to be used according to the price of the materials, the possibility to obtain the same according to local conditions, and the like. We prefer to use sodium hyposulfite or potassium rhodanid. The amounts of the substances to be used may be varied. The operator will find by experiment the proportions suited for the special ore to be treated. In most cases we have found it preferable to use the same amount of the hyposulfite or rhodanid as that of the potassium cyanid. A suitable solution for extracting gold contains .5 per cent. potassium cyanid and .5 per cent. hyposulfite or rhodanid. By lixiviating auriferous ores containing antimony and arsenic with a solution of .5 per cent. potassium cyanid and .5 per cent. hyposulfite or rhodanid

we have extracted eighty per cent. of the amount of the gold present in the ores, whereas we have extracted only twenty per cent. of the amount of the gold by lixiviating the same ores with a solution of .5 per cent. potassium cyanid alone. Moreover, we have found it preferable to add to the solutions of potassium cyanid and hyposulfite or rhodanid or to the solutions of potassium cyanid, hyposulfite, and rhodanid a suitable proportion of alkali chlorids. We have found that sodium chlorid is a most suitable substance for our purposes. The amount of the sodium chlorid may be varied. The operator will find the proportions suited for the special ore to be treated by experiment. In most cases we have found it preferable to use the same amount of sodium chlorid as that of the potassium cyanid, rhodanid, and hyposulfite. We prefer to use a solution containing .5 per cent. potassium cyanid, .5 per cent. hyposulfite, (.5 per cent. rhodanid,) .5 per cent. sodium chlorid.

For carrying out our invention we prepare a solution of potassium cyanid, dissolve in the liquid thus obtained the other ingredients, and then lixivate the ores with this liquor. We may, however, also prepare the solution of potassium cyanid, pour the same over the ore, and then introduce the other additions. After the lixiviation of the ore is found by suitable tests to be completed, if further quantities of gold can be extracted by prolonging the lixiviation, we separate the liquid from the undissolved remainder in any suitable way—for instance, by pouring off the liquor, by filtration, or the like—and precipitate the dissolved gold from the liquid by electrolyzing the same or in any other suitable way.

While the addition of sodium chlorid to a solution of potassium cyanid will not raise the yield of gold in the subsequent lixiviation of the ores to such a degree that the cost of the addition of sodium chlorid is covered, sodium chlorid in presence of potassium cyanid and hyposulfite (or rhodanid) will considerably increase the output of gold.

The rhodanid, which for the purposes of

this invention is an equivalent of the hyposulfite, is not specifically claimed in this application, since it forms the subject-matter of an application hereafter to be filed.

5 Having now particularly described and ascertained the nature of our said invention and the manner in which the same is to be performed, we declare that what we claim is—

10 1. The herein-described process for extracting gold from auriferous ores which consists in lixiviating the ores with a solution of potassium cyanid, hyposulfites and sodium chlorid.

2. The herein-described process for extracting gold from auriferous ores which consists in lixiviating the ores with a solution of potassium cyanid, rhodanids, hyposulfites and sodium chlorid. 15

In testimony whereof we have affixed our signatures in presence of two witnesses.

MANUEL V. USLAR.

GEORG ERLWEIN.

Witnesses:

HENRY HASPER,

WOLDEMAR HAUPT.