

lining, has at the bottom a tapping-hole A, somewhat above it a blast tuyère or set of tuyères B, at a higher level another tuyère or set of tuyères C. Between the two tuyères there is an outlet D connected to any known suitable condensing and collecting apparatus. At the top of the furnace there is a feeding-door E, and a passage F provided with a valve or damper, which may be more or less opened as an outlet for products of combustion. This furnace is charged with carbonaceous matter, such as coal, coke, charcoal, or mixtures of these, and with potassic carbonate, or other compound of potassium which is capable of being reduced by heating with carbonaceous matter. There may be also added fluxes in order to obtain a suitable slag.

On first starting, the carbonaceous matter alone is employed, using only the lower blast, and when the contents of the furnace are sufficiently ignited the upper blast is also employed, the potassium compound is thereafter added with the fuel, the process then going on continuously. The combustion maintained by the upper blast, and the passage upwards of its products, or of a portion of them, have the effect of thoroughly drying and heating the material as it descends. The two blasts, which are preferably heated, and the outlet at the top, may be so adjusted that more or less of the products of the combustion maintained by the upper blast may descend through the material below. The potassic cyanide formed at the hot zone near the lower tuyères, it may be also with cyanide formed near the upper tuyères and descending therefrom, passes in a state of vapour or fume along with the other products through the lateral outlet D, to be condensed, collected, and cooled in any known manner. The furnace may be inclined.

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

1. The herein-described method of producing and collecting potassic cyanide by subjecting in a furnace a mixture of carbonaceous matter and a suitable compound of potassium to the action of the blasts from two tuyères or sets of tuyères, so arranged relatively to an outlet for the cyanide vapour or fume that the mixture is dried and heated by the combustion maintained by the one blast before being acted on by the combustion maintained by the other blast.

2. A furnace provided with a lower set of tuyères B and upper set C, and an intermediate outlet D, substantially as and for the purpose set forth.

Dated this 23rd day of November, 1894.

W. McD. MacKey.

IMPROVEMENTS IN OBTAINING GOLD AND SILVER FROM ORES AND OTHER COMPOUNDS, AND APPARATUS THEREFOR.

I, James Nicholas, of Waterloo, in the County Palatine, of Lancaster, England, manufacturing chemist, do hereby declare the nature of my invention for "Improvements in obtaining Gold and Silver from Ores and other Compounds, and Apparatus therefor," and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention has principally for its object the obtaining of gold from its ores or other compounds, but it is also applicable for obtaining silver from its ores and other compounds, and it also comprises an improved process and apparatus which, while applicable to ores and other compounds generally, is effectual with ores and other compounds from which gold and silver hitherto have not been easily obtainable, because of the presence of various other metals or their compounds, or because of the physical or chemical conditions of the gold and silver in the ore or other compounds. The ore or other compound in a powdered condition is treated with oxalic acid only, or with oxalic acid in conjunction with a hypochlorite, either or both. If the ore or other compound be treated with oxalic acid only, then it is but a preliminary treatment to some other process, such as the cyanide-amalgamation or chlorination processes for the purpose of extracting gold and silver from ores and other compounds, than the process hereinafter described. But if oxalic acid is used in conjunction with a hypochlorite, then the extraction of the gold contained in the ore or other compound may be obtained in solution, the gold in it being converted into chloride of gold without the aid of any other process, while any silver which is present will be converted into chloride of silver, and will be retained in the ore or other compound which has been so treated.

The method which I have adopted by preference in carrying out this invention is as follows: I reduce the ore or other compound containing gold and silver to a pulverulent condition, and then saturate it with a solution of oxalic acid, and this I do in the following manner: The powdered ore or other compound is conveyed into a vessel made of suitable material. This vessel is constructed with a perforated false bottom, covered with a filtering-web. This vessel is also furnished with an upright geared shaft, and to this shaft are attached arms to act as stirrers. At the bottom of these arms are placed scrapers or brushes, so arranged that when the shaft revolves in and stirs the powdered mass under treatment these scrapers or brushes will graze or lightly rub the filtering-web, and so keep open its pores, prevent clogging, and so permit the free filtration or drainage of the liquid from the ore or other compound under treatment. The vessel may also be so constructed that an arrangement to hasten filtration by suction may be adapted if desired; and it may also be so constructed that operations in it may be conducted under pressure if pressure is deemed necessary. The pulverised ore or other compound which has been placed in the vessel is saturated with oxalic-acid solution, which, for convenience, is stored in a vessel, and placed at a higher level than the first-mentioned vessel, such saturation being accomplished by either upward or downward percolation, or by both. When the ore or other compound is completely saturated with the oxalic-acid solution, and shows strong acid reaction, the superfluous liquid is preferably drawn off, and liquid hypochlorite of lime (which for convenience is stored in a tank similarly placed) is caused to percolate by either upward or downward filtration, or by both, through the pulverised ore or other compound which has been saturated with the oxalic-acid solution, and this percolation of the hypochlorite of lime solution is continued, until a strong persistent chlorous odour begins to rise from the ore or other compound which is under treatment. When this chlorous odour is distinctly and persistently discernible, the flow of the hypochlorite of lime solution is arrested, and time