UNITED STATES PATENT OFFICE.

JAMES C. AYER, OF LOWELL, MASSACHUSETTS.

IMPROVED PROCESS FOR DESULPHURIZING AND DISINTEGRATING ORES.

Specification forming part of Letters Patent No. **46,619**, dated March 7, 1865; antedated January 24, 1865.

To all whom it may concern:

Be it known that I, JAMES C. AYER, of Lowell, in the county of Middlesex and State of Massachusetts, have invented a new and Improved Process for Desulphurizing, Oxidizing, and Disintegrating Metalliferous Ores; and I do hereby declare that the following is a full and exact description thereof in such detail as will enable any person skilled in the art to practice and perform the same.

My invention particularly relates to the treatment of quartz-rock or ores containing the precious metal preparatory to the amalgamating process, but is applicable to other ores than those which are auriferous or argentiferous; and the object of my invention is the speedy and effectual desulphurization, oxidation, and disintegration of the rock or ore by a process which, while it is speedy and effectual, is at the same time cheap and simple to perform.

I will describe my process as applicable to the gold and silver ores, which process may be observed in the treatment of other ores for the purpose of their desulphurization, oxidation, and disintegration.

I take masses of quartz-rock which contain precious metal, in the condition such masses come from the mine, and place them in a furnace, where they are subjected to a high degree of heat, less than sufficient to smelt the ore. When so heated the rock is subjected to a bath of alkaline lye. This may be done by appliances so arranged as to cause the rock or ore to be submerged in such bath; or the lye may be applied in the form of a stream or spray-jets upon the ore while in the furnace, or to masses of the ore after being taken from the furnace, but while in a highly-heated state. This treatment disintegrates the ore and more or less oxidizes the baser metals in it. It is reheated, during which the heat so acts upon the ore thus impregnated with the alkaline lye as to rapidly effect its further oxidization, and disintegration, and desulphurization. The mass of rock or ore thus a second time heated, if not found to be sufficiently disintegrated or reduced to a soft state, in which it may be easily pulverized, is again subjected to a bath of the alkaline lye, as before, and again heated. This operation may be repeated or continued a greater or less number of times, according to the refractory qualities of the ore, until the desired disintegration, desulphurization, and oxidation are attained. When the rock is of a friable nature the bath may be applied by a stream of the lye or jets upon the ore while in the furnace. If, however, the ore is of a refractory nature, the bath should be applied by the submersion of the ore.

The aforegoing treatment of the rock or ore completely effects its disintegration, oxidizes the baser metals, expels the sulphur, arsenic, and other foreign matter, and so reduces the ore that it can be easily ground or pulverized, and leaves all or nearly all the precious metal contained in the ore free for amalgamation.

What I claim as my invention or discovery, and desire to secure by Letters Patent of the United States, is—

1. The application of treating rock or ores while in the heated state with an alkaline solution, substantially as described, for the purpose of partial disintegration, desulphurization, and oxidation of the same.

2. The application of re-treating ores which have been heated substantially as above described, and the same repeated for the complete disintegration, desulphurization, and oxidation of the same.

JAMES C. AYER.

Witnesses:
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