UNITED STATES PATENT OFFICE.

JAMES C. AYER, OF LOWELL, MASSACHUSETTS.

IMPROVED PROCESS FOR DESULPHURIZING AND DISINTEGRATING ORES, &c.

Specification forming part of Letters Patent No. **46,620**, 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 metals preparatory to the amalgamating process, but is applicable to ores other than those which are auriferous or argentiferous; and the object of my invention is the speedy and effectual desulphurating, oxidating, and disintegrating of the rock or ore by a process which, while it is speedy and effectual, shall at the same time be cheap and simple.

A description of my process as applied to the ores of precious metals will be a sufficient indication of its application to other ores.

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, but less than sufficient to smelt the ore. When so heated the rock is subjected to a saline solution, or a solution of common salt. This may be done by appliances so arranged as to cause the rock or ore to be submerged in a bath of such solution, or the solution may be applied in the form of a stream or jets upon the ore while still 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. The ore is then reheated, during which act the heat so operates upon the ore thus impregnated with the saline solution as to rapidly effect its further oxidation, and disintegration, and desulphurization. The mass of rock or ore thus a second time heated, if not found to be sufficiently reduced to a state in which it may be readily ground or pulverized and completely oxidized, is again subjected to a bath of the saline solution as before, and again heated. This operation may be repeated or continued a greater or less number of times, according as the refractory qualities of the ore render it necessary for the attainment of a complete state of oxidation and disintegration.

In case the rock is of a friable nature, the bath may be applied in the form of a stream or jets upon the heated 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 contained therein, expels the sulphur, arsenic, and other foreign matter, and so reduces the ore that it can be readily ground or pulverized, and leaves the precious metal in it 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 a saline 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:

A. H. TAYLOR,

BENJ. WALKER.