

UNITED STATES PATENT OFFICE.

MATTHEW LAFLIN, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN TREATING ORES.

Specification forming part of Letters Patent No. **141,147**, dated July 22, 1873; application filed June 14, 1873.

To all whom it may concern:

Be it known that I, MATTHEW LAFLIN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Treating Ores; and I 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 pertains to make and use it.

The object of this invention is to treat ores so as to separate sulphur and other impurities, render them fit to be pulverized, and for smelting; also for separating and collecting the precious metals when any are contained in them. This object is attained by breaking up the combination formed by sulphur and other substances in ores containing gold, silver, copper, lead, and zinc, and, indeed, all ores containing sulphur; and, after breaking up that combination, then to separate or destroy the effects of the sulphur and other foreign substances, so as to obtain an easy and cheap method of securing the metals in a state ready for use. This is accomplished by first heating the ores in retorts, so as to exclude the air without destroying the metals in process of heating. After removing the ores from the retort, the next process is to place them in an alkaline fluid, either hot or cold, and any combination of an alkali and other substances, or of steam, whereby disintegration may be effected and the several ingredients of the ore be separated. The ores when retorted should be spalled into various sizes, mostly like egg coal, or even larger, and the fluid to be used after the heating process should be of sufficient strength of alkali to completely neutralize the effects of the sulphur and other foreign substances. Provision must be made for the thorough stirring of the ores during the time they are immersed in the alkali and other fluids, and then the metals can be readily obtained in various ways, such as by chloridizing, or by the use of quicksilver, or smelting, or other treatment.

In carrying out my invention, I first prepare the ore by breaking it into lumps, say, the size of egg coal, or larger. The ore is

then placed in a clay retort, or retort of other refractory material, such as used for the manufacture of coal-gas, where it may be highly heated without access to air. The retort must have an opening for the gases formed to escape. The opening is placed by preference at the rear end and opens into a flue, in which a spray or jet of water plays to condense any matters carried over. The charging-hole is provided with a closely-fitting cover, so that no air will enter the retort while the heating process is going on. The heat is not raised so high as to fuse the ore, and will therefore vary according to the quality of the ore. Copper ores containing sulphur may be raised to a white heat. In front of the retort is placed a tank of brick, stone, earthenware, wood, or other suitable materials filled with water containing alkali of sufficient strength to neutralize the sulphur in the ore. The cheapest alkali for this purpose is generally caustic-soda made by the action of quicklime on sal soda; but other alkali may be used. Into this tank the hot ore is precipitated from the retort. The sudden quenching of the hot ore in the alkaline solution renders it very friable, so that it may be easily ground in any kind of an ore-mill, and the alkali neutralizes the sulphur, so that it does not interfere with the further treatment of the ore, whether used for smelting, amalgamating, or chloridizing. The ore while in the alkaline liquid may be boiled for any length of time found requisite for completing the action of the alkali upon the sulphur.

Instead of the above the process may be varied for some ores as follows: Heat the ore in a closed retort, as above, and while hot immerse it in water, and then pulverize in any suitable machine. After it is reduced to an impalpable powder treat with a solution of caustic alkali in water, either hot or cold. It may be boiled for several hours, or, by taking a longer time, the cold solution will answer every purpose. In any case the alkaline solution is washed out so as to fit it for the after treatment, which is effected by stirring with water and then leaving it to completely set-

tle, when the water is drawn off and the ore is then ready for smelting, chloridizing, or amalgamating by any known process.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is—

The process herein described for treating ores, the same consisting in heating them in a close retort so as to prevent access of air, and

then subjecting them to the action of a caustic alkaline solution, substantially as set forth.

In testimony that I claim the foregoing, I have hereunto set my hand this 14th day of July, 1873.

MATTHEW LAFLIN.

Witnesses:

C. J. HEDRICK,

GEO. W. STOKES.