United States Patent Office.

WILLIAM F. GOODWIN, OF EAST NEW YORK, AND CHARLES R. SQUIRE OF NEW YORK, N. Y.

Letters Patent No. 68,561, *dated September* 3, 1867.

IMPROVED PROCESS FOR DISINTEGRATING AND DESULPHURIZING ORES AND MINERALS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that we, WILLIAM F. GOODWIN, of the town of East New York, in the county of Kings, and State of New York, and CHARLES R. SQUIRE, of the city of New York, in the county of New York, and State of New York, have invented a new and useful Process for Disintegrating and Desulphurizing Rocks and Ores of all kinds requiring disintegration or desulphurization, or both, preparatory to their being reduced to atoms by grinding, stamping, or any other process, whereby the rock may be pulverized for the purpose of extra ing gold, silver, or any other metals or elements which the rock may contain.

This process is intended to apply to all rocks and ores, such as porphyry, quartz, granite, agate, and other hard, flinty substances, the working of which may be facilitated by disintegration or desulphurization, and also to all sands and sulphurets requiring desulphurization or disintegration.

This invention consists in the application of the gases and properties obtained from shells of any and all kinds, or from bone or limestone, to rocks, ores, sands, or sulphurets while in a heated state or condition, for the purpose of disintegrating or desulphurizing the same. The shells most used will be oyster, clam, and muscle shells, they being the most plentiful and easily obtained. The gas will be obtained and applied by burning the shells in a retort or furnace, wherein the ore or rock or other substance to be treated is confined and heated, or the gas may be obtained by burning the shells in retorts and securing the gases in bags, cans, or any suitable vessels in which the gases can be conveyed to any required point and used when it would be difficult to transport the shells. The best and most practical plan, when shells can be got to the place where the rock or ore is worked, is to burn the shells in the retort or furnace with the ore or substance treated.

To enable those requiring our process to understand and use the same, we will proceed to describe the manner in which it is generally applied, and the results derived from the use thereof.

The furnaces used with this process are constructed in the usual form and manner, and of the same material, as for the ordinary gas-works, the furnaces having retorts placed over them in the same manner as for gas-works. The retorts are provided with an exhaust pipe, the outer end of which is immersed in liquid or fluid contained in a vessel, which is properly placed to receive it. The vessel also contains mercury, for the purpose of amalgamating with the gold or silver or other precious metals which may be carried through the exhaust pipes by the fumes. The ore is placed in the retort with a quantity of shells, say one-half bushel of shells to the ton of ore, more or less, as the case may require, after which the door of the retort is closed, to confine the gases and fumes arising from the shells and ore, and compel such fumes and gases to escape through the exhaust pipe and pass through the liquid in the vessel, when they will be condensed, and all the particles of gold and other precious metals, as well as the sulphur, will be retained, each settling in the bottom of the vessel according to their several specific gravities, the gold and silver and other precious metals amalgamating with the mercury, from which they can be extracted in the usual way. The retort is also provided with a receiving pipe through which gas or air can be supplied to the ore. The ore is heated in the retort to any required heat, say about a red heat, after which the door of the retort is opened and the ore drawn out and precipitated into a bath of water or liquid. If the first heating is not sufficient to thoroughly decompose the ore or rock the ore is again placed in the retort, with an addition of shells, and treated as before, until a thorough disintegration and desulphurization takes place. The water or liquid thus used for chilling the rock or ore should be strained and the residuum amalgamated with mercury, as it will be found to contain particles of the precious metals. The rock or ore should be subjected to the heating and bathing process a sufficient length and number of times to thoroughly crack the rock or ore and give the gases from the shells a chance to penetrate and operate on the sulphur and integral properties of the rock or ore. The gases of the shells, having a very great affinity for the sulphur and the integral properties of the rock or ore, penetrate and enter into combination with such properties and sulphur, and bear them away, thus separating, disintegrating, and desulphurizing the rock or ore. The sulphur, and all the integral properties of the rock or ore, and all the baser metals, will be carried off with the gases through the exhaust pipe into the vessel. When the rock or ore is thus treated it becomes soft, and crumbles, and can be easily crushed and pulverized, and the gold, silver, and other precious metals can be amalgamated with mercury and extracted in the usual way.

Having thus described and explained our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The use of oyster, clam, or other shells, or bone, for the purpose of desulphurizing, disintegrating, dissolving, and separating rocks and ores, in the manner substantially as described.

2. Burning oyster, clam, or other shells, or bone or limestone, in furnaces or retorts, with rock or ore, for the purpose of disintegrating and desulphurizing such ore or rock, preparatory to extracting the gold or other precious metals, substantially as described.

3. Burning oyster, clam, or other shells, or limestone or bone, in retorts, and securing the gases obtained therefrom in bags or vessels, to be used as and for the purpose substantially as described.

4. Heating rock or ore in a retort, for the purpose of disintegrating and desulphurizing the same, and also for the purpose of securing and retaining the particles of the precious metals which may be driven off from the ore and deposited in a vessel, substantially as described.

WILLIAM F. GOODWIN,
C. R. SQUIRE.

Witnesses:
CHAS. D. SMITH,
J. E. M. BOWEN.