UNITED STATES PATENT OFFICE.

ALEXANDER K. SEDGWICK, OF SAN JOSE, CALIFORNIA.

PROCESS OF EXTRACTING SULFUR FROM SULFUR ORES.

1,318,015. Specification of Letters Patent. Patented Oct. 7, 1919.

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To all whom it may concern:

Be it known that I, ALEXANDER K. SEDGWICK, a citizen of the United States, and a resident of San Jose, county of Santa Clara, and State of California, have invented a new and useful Process of Extracting Sulfur from Sulfur Ores, of which the following is a specification.

The invention relates to a process of extracting sulfur from ores containing sulfur.

Sulfur is ordinarily extracted from its ore by heating the ore to a temperature sufficiently high to melt the sulfur, which then flows in liquid form from the mass of ore and is collected. Many sulfur ores, however, contain finely divided particles of other material such as clay, earth or sand, or material which breaks up into finely divided particles when heated, such as some classes of shale, and these finely divided particles mix with and flow out with the melted sulfur, so that pure sulfur or a commercial grade of sulfur is not obtained.

An object of my invention is to provide a process of extracting sulfur from sulfur ores containing finely divided material or material which becomes finely divided on heating.

In accordance with my invention I heat the sulfur ore to a temperature sufficiently high to melt the sulfur, so that the sulfur becomes liquid, and then subject the heated mass to the action of centrifugal force, while maintaining such temperature so that the liquid sulfur is separated from the remainder of the ore, and then cool the mass to solidify the liquid sulfur while under the influence of the centrifugal force. The liquid sulfur, being of different specific gravity than the other materials in the ore, is separated therefrom by centrifugal force, and by cooling the mass while subjected to centrifugal action, the separated sulfur is solidified and the separation thereby maintained. Sulfur melts at approximately 239° Fahrenheit and on gradually increasing the heat above that point the sulfur becomes brown and viscous. If the heat is continued, the mass liquefies again at 500° Fahrenheit. In accordance with my process the sulfur may be heated to either liquefaction point before being subjected to centrifugal force, although on account of its lower temperature, the first liquefaction period is probably preferable.

In practice, I place the ore, preferably in a crushed condition, in a centrifuge and heat it to the liquefaction temperature of the sulfur. The ore may be agitated to secure an equal distribution of heat. After the sulfur has melted, the centrifuge is rotated to separate the liquid sulfur from the remainder of the ore and the mass is then cooled while in rotation, to solidify the sulfur, after which the mass is removed from the centrifuge, and the sulfur separated from the remainder of the ore.

When desirable, the sulfur in the ore may be melted before being placed in the centrifuge, but under such conditions the sulfur must be kept in the liquid form in the centrifuge for a sufficient time to permit the centrifugal force to complete the separation. It is also desirable in some instances to add water or other liquid, in which sulfur is not soluble, to the ore before it is heated, the water being present in sufficient quantity to insure the proper transfer of heat throughout the mass. When water is used, the centrifuge chambers in which the ore is placed must be tightly closed in order that the desired temperature may be attained. When the mass has been sufficiently heated to melt the sulfur, it is subjected to centrifugal force to separate the liquid sulfur from the remainder of the mass, and is cooled while subjected to the action of such force, to solidify the separated sulfur.

I claim:

1. The process of extracting sulfur from sulfur ores, which includes heating the ore to liquefy the sulfur, subjecting the heated ore to the action of centrifugal force to separate liquid sulfur from the remainder of the ore and then cooling the mass to solidify the sulfur while it is subjected to said centrifugal action.

2. The process of extracting sulfur from sulfur ores, which consists in heating the ore to liquefy the sulfur, subjecting the heated ore to the action of centrifugal force to separate liquid sulfur from the remainder of the ore, and then cooling the separated sulfur.

3. The process of extracting sulfur from sulfur ores, which consists in crushing the ore, heating the crushed ore to liquefy the sulfur, subjecting the heated ore to the action of centrifugal force to separate liquid sulfur from the remainder of the ore, and

then cooling the mass while it is subjected to centrifugal force.

4. The process of extracting sulfur from sulfur ores, which consists in adding to the ore a liquid in which sulfur is insoluble, heating the mixture in a closed vessel to a temperature sufficiently high to liquefy the sulfur, subjecting the mixture to the action of centrifugal force while maintaining said temperature, and then cooling the mixture while it is subjected to the action of centrifugal force.

In testimony wherof, I have hereunto set my hand at San Francisco, California, this 27th day of September, 1917.

ALEXANDER K. SEDGWICK.