

UNITED STATES PATENT OFFICE.

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LABORATORY COMPANY, A CORPORATION OF OHIO.

PROCESS OF TREATING SULFID ORES.

No. 845,868.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, OTOKAR FRONEK, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Processes of Treating Sulfid Ores, of which the following is a specification.

The object of this invention is to provide an economical process of treating sulfid ores, more particularly such as contain lead and zinc together with silver, for the purpose of converting the constituent metals into chlorids. The chlorids obtained may be there- after treated for the separation of the metals in pure state by any suitable or known method.

In the treatment of ores of this character it has heretofore been proposed to suspend them in a bath of fused zinc chlorid or of a mixture of chlorids of zinc and lead, and to subject them therein to the action of chlorin or of sulfur chlorid. (See United States Patents Nos. 691,822 and 695,126.) This process is subject to a number of disadvantages, among which may be mentioned the loss of zinc chlorid by volatilization when the fused mass is heated to the vaporizing-point of sulfur and the fact that it is impracticable to treat in this manner ores which contain more than thirty per cent. of gangue by reason of the lack of fluidity of the resulting mixture.

According to this invention an alkali metal chlorid, preferably sodium chlorid, is added to form with part or all of the zinc chlorid contained in the fused bath a double salt. The sulfid ore is mixed with or suspended in such fused double salt and is subjected therein to the action of a chloridizing agent, as free chlorin or sulfur chlorid. This procedure possesses marked advantages, as follows: First, the resulting mixture has, as compared with zinc chlorid, a lower melting-point, but a higher volatilizing point. This not only insures that no zinc chlorid shall be lost when the temperature is raised to a point sufficient to volatilize the separated sulfur, but it permits the initial fusion of the bath to be accomplished with relatively little difficulty. Second, the bath is comparatively very fluid

and mobile. This not only facilitates the distribution of the gaseous chloridizing agent, enabling it to react upon all of the suspended ore, but it permits the treatment of ores which contain a relatively high percentage of gangue—say, in excess of thirty per cent.—the treatment of which in a bath consisting of zinc chlorid alone or of chlorids of zinc and lead is impracticable by reason of the pasty character of the bath.

I prefer to proceed substantially as follows: A mixture of zinc chlorid and sodium chlorid, which may be used in approximately molecular proportions, is fused in a suitable vessel and a quantity of the ore mixed with sodium chlorid is added thereto. The resulting mixture is then subjected to the action of a chloridizing agent, as chlorin or sulfur chlorid, preferably introduced at or near the bottom of the mass. In case chlorin is used the corresponding metallic chlorids are formed with liberation of sulfur, as is well understood, the sulfur subliming and being collected in a suitable chamber. In case sulfur chlorid is employed the reaction is similar save that sulfur is set free both from the ore and the sulfur chlorid. The resulting metallic chlorids may be purified from compounds of iron or manganese and treated for the separation of the metal or metals by known methods.

The salt is preferably mixed with the ore before adding the same to the fused chlorid bath, since in this way the composition of the mixture is readily maintained substantially constant.

The invention is not restricted to the use of the salt in molecular proportions or in any specific proportions, the essential feature being the employment of a sufficient quantity to accomplish the advantages above set forth.

I claim—

1. The process of treating sulfid ores containing zinc which consists in subjecting them to a chloridizing agent in presence of a molten bath containing zinc chlorid and sodium chlorid in approximately molecular proportions, substantially as described.
2. The process of treating sulfid ores

which consists in adding to the ore a chlorid of an alkali metal, introducing the mixture into a bath containing molten chlorids, and subjecting it therein to a chloridizing agent, substantially as described.

5 3. The process of treating sulfid ores containing zinc which consists in adding sodium chlorid to the ore, introducing the mixture into a bath containing chlorids of zinc and

sodium, and subjecting it therein to a chloridizing agent, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

OTOKAR FRONEK.

Witnesses:

THOMAS PIWONKA,
A. S. PIWONKA.