UNITED STATES PATENT OFFICE.

RUDOLF GAHL, OF DENVER, COLORADO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO PNEUMATIC PROCESS FLOTATION COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

FLOTATION PROCESS.

1,346,819. Specification of Letters Patent. Patented July 20, 1920.

No Drawing. Application filed December 10, 1918. Serial No. 266,024.

To all whom it may concern:

Be it known that I, RUDOLF GAHL, a citizen of the United States, residing at Denver, in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Flotation Processes, of which the following is a specification.

This invention relates to so-called "flotation processes" for the concentration of ores, and comprises a novel procedure by means of which the efficiency of these flotation processes may be very greatly improved, particularly in their application to certain ores which are unsuited for treatment by the ordinary methods. The invention will be described in its application to the flotation of sulfid or even carbonate ores containing small percentages of copper, by means of air bubbles used in conjunction with suitable hydrocarbon substances, such as coal-tar and allied products. It is believed, however, that the present improvement is applicable to flotation processes in general.

It is a matter of common observation that certain ores or ore-batches do not respond well to the flotation treatment; and more or less refractory ores have been discovered wherever concentration by flotation has been attempted, the difficulty being that the gangue matter has too much tendency to float. Even in ore bodies consisting largely of good flotation ores, portions are found which are less suited for this treatment; and in ore mixtures which respond well to flotation, portions can frequently be sorted out which do not so respond when treated by themselves. For this reason, the mixing of different ores has proven beneficial in a great many cases. In many cases, however, the ores necessary to constitute a properly responsive mixture are not available, and for such cases the process herein described will prove particularly useful.

I have observed that ores which are refractory to the ordinary flotation treatment can be handled without difficulty, and with a reasonably high degree of efficiency, provided there are added to the ore, and thoroughly mixed therewith, certain solid substances which are not themselves floated, and which do not apparently enter at all into the flotation reaction.

In my prior application Serial No. 75,344, filed January 31, 1916, I have described the use of iron or steel in a fine state of subdivision.

My present invention is based on the discovery that other solid substances, such as granular sand, have a similar effect in facilitating the flotation of otherwise refractory ores. Such sands, for example, may be conveniently obtained by separating the tailings from a flotation machine into sand and slime, a suitable amount of the sand portion being returned to the flotation machine, which therefore treats this sand product in addition to its regular feed of ground ore.

My invention is particularly adaptable to the flotation of ore mixtures which are refractory to flotation on account of the excessive amount of primary slime.

While I have referred to the use of sand, other granular non-metallic material may be used to produce a like result.

I claim:

A process of concentrating ores by flotation which consists in introducing additional sand substantially free from slimes into the normal pulp and subjecting the mixture to froth flotation.

In testimony whereof I affix my signature.

RUDOLF GAHL.