

UNITED STATES PATENT OFFICE.

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MANUFACTURE OF SULFID OF ZINC.

1,063,356.

Specification of Letters Patent.

Patented June 3, 1913.

No Drawing.

Application filed December 1, 1908. Serial No. 465,542.

To all whom it may concern:

Be it known that we, JOSEPH KOETSCHET, a citizen of the Swiss Confederation, residing at St. Fons, Lyon, in the Republic of France, scientific director of Societe Chimique des Usines du Rhone, and JOANNES CLAUDE ANTOINE MEYER, a citizen of the Republic of France, residing at 208 Avenue Felix Faure, Lyon, France, chemist, have invented a new and Improved Manufacture of Sulfid of Zinc, of which the following is a specification.

Among the substances capable of serving as substitutes for white lead, those which have hitherto found most favor are zinc oxid and lithopone. Zinc oxid or zinc white is obtained by distilling metallic zinc, but apart from its dearthness it possesses the disadvantages that it has an insufficient covering power and that it cannot be used for outside work owing to its inability to stand the weather. As regards lithopone, which is composed of about 30 per cent. of sulfid of zinc and 70 per cent. of barium sulfate, this has a considerably greater covering power than oxid of zinc, but on the other hand it is subject to the objections of blackening in the light and of containing too great a proportion of barium sulfate, which possesses almost no covering power at all. It follows that the covering power of the mixture known as lithopone is almost entirely due to the presence of the zinc sulfid. Further it has been long recognized that pure sulfid of zinc has a much greater covering power than white lead, but the difficulty of obtaining it perfectly white and relatively cheaply has not hitherto allowed of its being used for painting. It is known that it is possible to precipitate small quantities of sulfid of zinc from zinc salts of mineral acids by means of sulfureted hydrogen, but the precipitation is arrested very rapidly when the operation is performed under the usual conditions. This stopping of the reactions has hitherto been attributed to the increase of free acid formed in the solution and consequently care is always taken in practice to work with very dilute solutions with the object of obtaining sufficient precipitation.

We have found that contrary to the views above indicated it is possible to precipitate from an almost saturated solution of sulfate

of zinc (for example) the greater portion of the zinc in the form of a sulfid by establishing intimate and prolonged contact between the solution and the sulfureted hydrogen.

Example: A solution containing 45 per cent. of crystallized zinc sulfate is sprayed or atomized in an atmosphere of sulfureted hydrogen and the contact is maintained until the gas ceases to be absorbed. The greater portion of the zinc is thus converted into a pulverulent sulfid which can be easily filtered, as it presents no obstruction to the passage of the liquid during the filtration. This product is separated from the liquid portion which is strongly acid and can serve again for regenerating the initial solution by neutralization with a suitable zinc ore and purification by the known means. The idea underlying the invention consists in the intimate mixture of the liquid and gas, and it will be understood that this mixture can be attained by any known arrangement allowing of reducing a liquid to a state of division or of simply increasing the surface exposed. It is sometimes convenient to treat first with a weak current of H_2S which frees the solution from the heavy metals such as copper, tin, bismuth, cadmium, and antimony, which may be present as impurities. The solution is then filtered and is ready for the precipitation of the sulfid of zinc. The solution separated from the zinc sulfid can serve again for obtaining a new crude solution of zinc sulfate which serves as raw material. The sulfid of zinc obtained, which is chemically pure, is dried and can be used for painting work. It has a covering power 1.6 times greater than that of white lead.

The product manufactured according to this invention is distinguished from zinc sulfids precipitated according to the usual process by its non-colloidal pulverulent structure and its property of resisting the action of dilute mineral acids.

What we claim and desire to secure by Letters Patent is:—

1. A process for the manufacture of sulfid of zinc comprising subjection of a concentrated solution of zinc salts of mineral acids to intimate and prolonged contact with sulfureted hydrogen.

2. A process for the manufacture of sulfid of zinc comprising subjection of a con-

centrated solution of sulfate of zinc to intimate and prolonged contact with sulfureted hydrogen.

3. A process for the manufacture of sulfid of zinc, comprising subjection of a solution of crude zinc sulfate to preliminary treatment with sulfureted hydrogen with the object of precipitating impurities, filtration of the liquid, and subjection of the same as a concentrated solution to intimate and prolonged contact with sulfureted hydrogen to precipitate zinc sulfid.
4. A process for the manufacture of sulfid of zinc, comprising subjection of a concentrated solution of crude zinc sulfate to intimate and prolonged contact with sulfureted hydrogen until the solution attains strong acidity.
5. A process for the manufacture of sulfid of zinc comprising the subjection of a concentrated solution of zinc salts of mineral acids containing a greater proportion than one per cent. of metallic zinc to intimate and prolonged contact with sulfureted hydrogen.
6. A process for the manufacture of sulfid of zinc comprising the subjection of a concentrated solution of sulfate of zinc, said solution containing a greater proportion than one per cent. of metallic zinc to intimate and prolonged contact with sulfureted hydrogen.
7. A process for the manufacture of sulfid of zinc which comprises the subjection of a concentrated solution of zinc salts of mineral acids to intimate and prolonged contact with sulfureted hydrogen at ordinary temperatures without the application of heat.
8. A process for the manufacture of sulfid of zinc comprising the subjection of a concentrated solution of sulfate of zinc to

intimate and prolonged contact with sulfureted hydrogen at ordinary temperatures without the application of heat.

9. A process for the manufacture of sulfid of zinc comprising the subjection of a concentrated solution of crude zinc sulfate to intimate and prolonged contact with sulfureted hydrogen at ordinary temperatures without the application of heat, and continuing the treatment until the solution attains a strong acidity.

10. A process for the manufacture of sulfid of zinc comprising the subjection of a sub-divided concentrated solution of zinc salts of mineral acids to sulfureted hydrogen.

11. A process for the manufacture of sulfid of zinc comprising the subjection of a sub-divided concentrated solution of sulfate of zinc to sulfureted hydrogen.

12. A process for the manufacture of sulfid of zinc comprising the subjection of a sub-divided concentrated solution of crude zinc sulfate to sulfureted hydrogen until the solution attains a strong acidity.

13. A process for the manufacture of sulfid of zinc comprising the atomizing of a concentrated solution containing approximately forty-five per cent. of crystallized zinc sulfate in an atmosphere of sulfureted hydrogen and maintaining contact until the gas ceases to be absorbed.

In witness whereof, we have hereunto signed our names in the presence of two subscribing witnesses.

JOSEPH KOETSCHET.

JOANNES CLAUDE ANTOINE MEYER.

Witnesses:

THOS. N. BROWNE,
MARIN VACHON.