

UNITED STATES PATENT OFFICE.

GEORGE T. LEWIS, OF PHILADELPHIA, PENNSYLVANIA.

PROCESS OF MANUFACTURING ZINC OXIDE.

SPECIFICATION forming part of Letters Patent No. 495,593, dated April 18, 1893.

Application filed September 28, 1891. Serial No. 407,027. (No specimens.)

To all whom it may concern:

Be it known that I, GEORGE T. LEWIS, a citizen of the United States, residing in the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Processes of Manufacturing Zinc Oxide, of which the following is a true and exact description.

My invention relates to processes for making zinc oxide and especially to the treatment of such zinc ores as contain sulphur, and the object of my invention is to treat these ores in such a way that the sulphur will be entirely eliminated from the ore and the zinc oxide obtained free from any trace of sulphur.

In the production of oxide of zinc it has been customary to first desulphurize the ore by roasting, and then heat it in a compound reducing and oxidizing furnace to form the oxide, which is caught and saved in bags in the well known manner. The roasting of the ores however does not free them entirely from the presence of the sulphur and in consequence a small percentage of sulphate or sulphite of zinc is present in the oxidizing furnace and passes from the furnace together with the zinc oxide with which it remains in admixture and the value of which is seriously impaired by its presence.

In my present invention I free the ores from sulphur before the formation of the zinc oxide so that the remaining product shall be entirely free from the injurious impurities mentioned.

My improved process of manufacturing zinc oxide consists in mixing with the ores containing small percentages of sulphur a quantity of a salt having an alkaline base which is of such a character as to be either vaporized or melted at a temperature less than that at which sublimation of zinc occurs and which will form in combination with the sulphur present soluble sulphates; such salts are sodium nitrate, sodium chloride, sodium carbonate, sodium hydrate and equivalent potassium salts and others which will be at once recognized by chemists and metallurgists as having similar properties. I prefer however to use sodium nitrate because of the powerful oxidizing properties of the nitric acid liberated in this treatment; but on the other hand the sodium chloride will be found to be well

adapted for use and is of course readily and cheaply procured. The quantity of the salt required depends on the sulphur left in the ore each per cent. of sulphur requiring three and two-thirds per cent. of the salt which, however, is preferably used slightly in excess. The mixture formed as above is then heated or roasted to a temperature which will volatilize or fuse the salt causing it to permeate the mass of ore so that it will come in contact and form a union with all the sulphur present. The next step of the process consists in leaching out the soluble sulphates formed by the treatment above described, after which leaching the ores will be found to be free from any substantial or material percentage of sulphur.

The next step in my process of manufacturing zinc oxide consists in charging the ores thus freed from sulphur into an oxidizing furnace, preferably of the Wetherill type with carbonaceous material and oxidizing the zinc which passes off in the form of fuel and is collected in the usual way.

In cases where the ore contains a large amount of sulphur I first roast it to drive off the sulphur to as great an extent as possible and then add the salt of the alkaline base to the roasted ore. The salt may be added at the end of the calcination by stirring it in with the ore in the furnace but this requires a considerable excess of salt to insure a perfect reduction of the sulphur and I therefore prefer to draw the charge after it has been roasted and mixing the salt of an alkaline base with it outside of the furnace, subjecting the mixture to an additional heating or roasting to effect the desired combination with the sulphur and the formation of the soluble sulphates, after which I leach out the soluble sulphates and oxidize the ore thus freed from the sulphur.

I have in another application filed by me September 6, 1891, Serial No. 404,438, described and claimed a process for accomplishing the same results, to wit, the obtaining zinc oxide free from sulphates or sulphites and which resembles my present process in so far as the treatment of the roasted ore with alkaline salt is concerned, but in that process the alkaline sulphates were not extracted previous to the sublimation of the zinc.

Having now described my invention, what

I claim as new, and desire to secure by Letters Patent, is--

1. The process of manufacturing zinc oxide from zinc ores containing sulphur, which consists in mixing with the ore, sodium nitrate or its equivalent as described in quantity sufficient to unite with the sulphur present, roasting the mixture to effect the formation of a soluble sulphate leaching out the soluble sulphate, and finally oxidizing the zinc in the ores thus freed from sulphur and collecting the zinc oxide fume.

2. The process of manufacturing zinc oxide, which consists in roasting the ore to drive off

15 sulphur, mixing with the roasted ore sodium nitrate or its equivalent as described in quantity sufficient to unite with the sulphur left in the ore and exposing the mixture to a further roasting to effect the formation of a soluble sulphate then leaching out the soluble sulphate and finally oxidizing the zinc in the ores thus freed from sulphur and collecting the zinc oxide fume. 20

GEORGE T. LEWIS.

Witnesses:

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