

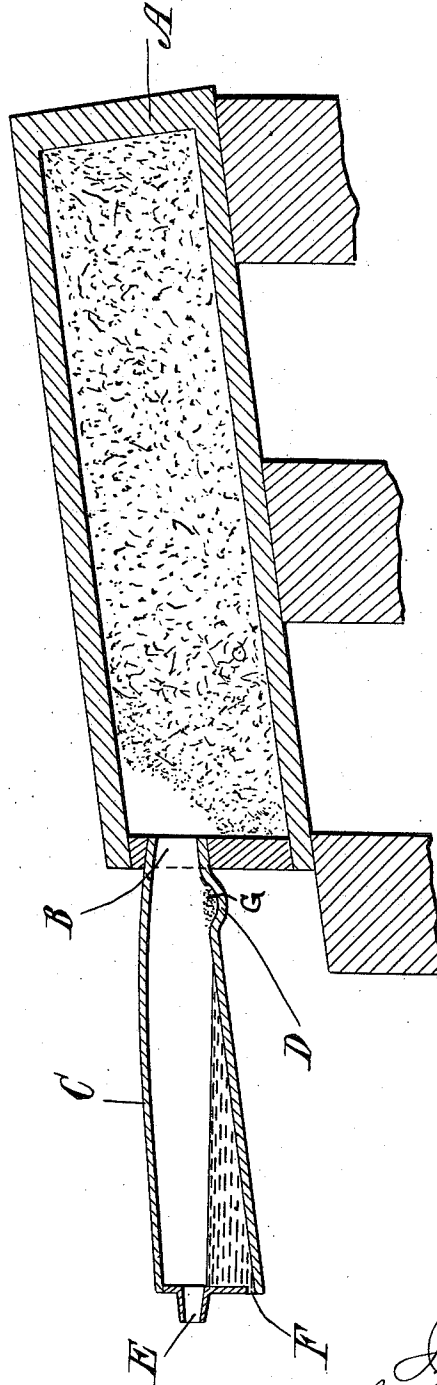
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ZINC DISTILLATION.

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1,030,676.

Patented June 25, 1912.



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UNITED STATES PATENT OFFICE.

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ZINC DISTILLATION.

1,030,676.

Specification of Letters Patent.

Patented June 25, 1912.

Application filed December 29, 1910. Serial No. 599,832.

To all whom it may concern:

Be it known that we, JOHN COLLETT MOULDEN and HAROLD WOLSTAN WEBSTER, subjects of the King of England, and residing in Seaton Carew, county of Durham, England, have invented certain new and useful Improvements in Zinc Distillation, of which the following is a specification.

This invention is for improvements in or relating to zinc distillation, the object being to render the distillation more efficient and particularly to increase the amount of spelter formed and to avoid the formation of zinc oxid.

The invention is particularly applicable to those ores of zinc which contain sensible proportions of lead and silver and the residues of which have to be treated after distillation for the recovery of their lead and silver contents.

The ores to be treated according to the present method must be oxidized ores, either as found in nature or otherwise oxidized.

In the distillation of zinc this invention consists in bringing into contact with the retort vapors a haloid salt such as sodium chlorid which in the presence of carbon monoxid tends to prevent the formation of zinc oxid and "blue powder."

More particularly in the distillation of zinc from products which contain other metals such as lead and silver this invention consists in placing a haloid salt such as sodium chlorid in the path of the retort vapors i. e. in the front of the retort or in the back of the condenser to diminish the production of zinc oxid and to increase the production of metallic zinc.

Hitherto it has been proposed in the distillation of certain zinc ores to mix common salt with the retort charge with the object of improving the distillation. It is found however that the salt has no beneficial effect in the actual decomposition of the ore but on the other hand the presence of salt in the charge is detrimental where the ore contains metals other than zinc (such as lead and silver) because the presence of the salt results in a chloridizing roast by which metals other than zinc are driven off in the form of volatile chlorids, thereby contaminating the zinc products and depleting the residues.

According to this invention the haloid salt such as sodium chlorid is not mixed with the retort charge but is so placed that

a vapor of the haloid salt comes in contact with the vapor from the retort.

In carrying this invention into effect (by way of example) in the case of a retort containing say two cwts. of a mixed charge containing an ore comprising compounds of zinc with some lead and silver, about 4 ozs. of salt are placed in the mouth of the retort; in order to separate the salt from the retort charge, a layer of coke breeze may be introduced into the mouth of the retort before the salt. Alternatively, the small quantity of salt may be placed at the back of the condenser, and this invention includes the provision of a small pocket or receptacle for salt at the back of the condenser and above the level of the condensed zinc. As the hot vapors from the retort pass over the salt, the vapor from the salt comes in contact with the vapors and the tendency is to prevent the formation of zinc oxid and to increase the yield of spelter.

Several advantages accrue from the invention. In the first place the quantity of spelter obtained from each retort charge is materially increased, and from the investigations made up to the present it appears that any lead carried over with the zinc readily settles out therefrom. The production of "blue powder" is diminished and the condensation is therefore better: and owing to the decrease of oxid fumes the furnace-man can more easily inspect the progress of distillation. In cases where the fumes from the condenser pass through a nozzle the flame is bright yellow and forms a useful source of illumination. The zinc products are found to be comparatively free of contamination.

The theoretical reasons for the advantageous results are not positively determined, but this invention would include the employment of any catalytic agent (such as other metallic chlorids) which in the presence of carbon monoxid will prevent the formation of zinc oxid.

This invention is applicable to the distillation of zinc by any known means, electrical or otherwise.

The figure shows a form of apparatus for carrying this invention into effect.

A is the retort into which the charge of zinc ore and carbonaceous material is inserted. The retort A has an opening B into which fits a condenser C, and is preferably

arranged so that it has a slope as has also the condenser. The condenser C is provided with a pocket D preferably of a shallow cup form, at a point near the opening into the retort, and is also provided with an outlet E for the gases from the retort and an outlet F from which the zinc is run off.

The charge is introduced into the retort and the condenser is placed in position with its end in the opening B of the retort. A layer of coke breeze may be introduced into the mouth of the retort. The joint of the condenser with the retort is packed with clay or other suitable material as is also the outlet F from which the molten zinc is run off. Into the pocket D is placed a small quantity of haloid salt G, as for example sodium chlorid. The retort is heated and the zinc vapors distil and pass into the condenser thereby heating the salt in the cup D and causing it to give off vapors. The vapors mix with the zinc vapor and enable them to condense in the lower end of the condenser without formation of zinc oxid and "blue powder". When sufficient zinc is condensed the plug of clay is removed from the opening F and the zinc is run off, another plug being placed in position to seal the condenser for a further time. The fumes from the retort pass through the condenser and out of the nozzle E.

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

1. The herein-described step in the process of zinc distillation which consists in bringing into contact with retort vapors a haloid salt to prevent the formation of zinc oxid.

2. The herein-described step in the process of zinc distillation which consists in bringing into contact with retort vapors common salt to prevent the formation of zinc oxid.

3. The herein-described process for the production of substantially pure zinc from oxidized ore which consists in heating the oxidized ore with a reducing agent to generate zinc vapor therefrom, bringing the vapor into contact with a haloid salt to prevent the formation of zinc oxid, and condensing metallic zinc.

4. The herein-described process for the

production of substantially pure zinc from oxidized ore which consists in heating the oxidized ore with a reducing agent to generate zinc vapor therefrom, bringing the vapor into contact with common salt to prevent the formation of zinc oxid, and condensing metallic zinc.

5. The herein-described step in the process of zinc distillation from retorts which consists in placing common salt in the path of the retort vapors for the purpose described.

6. The herein-described step in the process of zinc distillation from retorts which consists in placing common salt at the front of the retort for the purpose described.

7. The herein-described step in the process of zinc distillation from retorts which consists in placing common salt in the condenser at the back thereof and above the level of the condensed zinc for the purpose described.

8. The method of treating complex oxidized ores containing zinc and other metals for the recovery of metallic zinc substantially free from zinc oxid, which consists in mixing the ore with a reducing agent, heating the mixture to generate therefrom a vapor of zinc mixed with carbon monoxid, bringing a vapor of a haloid salt into contact with the zinc vapor to prevent the formation of zinc oxid, and condensing metallic zinc.

9. The method of treating complex oxidized ores containing zinc and other metals for the recovery of metallic zinc substantially free from zinc oxid, which consists in mixing the ore with a reducing agent, heating the mixture to generate therefrom a vapor of zinc mixed with carbon monoxid, bringing a vapor of common salt into contact with the zinc vapor to prevent the formation of zinc oxid, and condensing metallic zinc.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOHN COLLETT MOULDEN.

HAROLD WOLSTAN WEBSTER.

Witnesses:

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