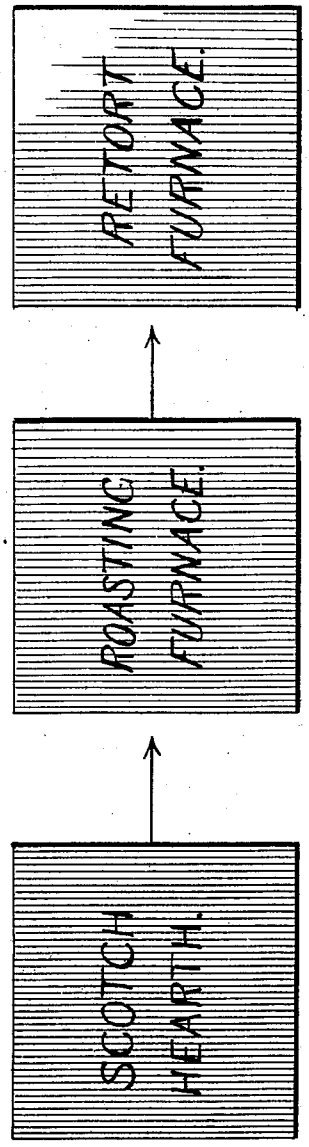
No. 735,903. PATENTED AUG. 11, 1903.

O. H. PICHER.

METHOD OF MANUFACTURING SPELTER FROM ZINC ORES.

APPLICATION FILED AUG. 26, 1899.

NO MODEL.



Witnesses:
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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UNITED STATES PATENT OFFICE.

OLIVER H. PICHER, OF JOPLIN, MISSOURI.

METHOD OF MANUFACTURING SPELTER FROM ZINC ORES.

SPECIFICATION forming part of Letters Patent No. 735,903, dated August 11, 1903.

Application filed August 26, 1899. Serial No. 728,572. (No specimens.)

To all whom it may concern:

Be it known that I, OLIVER H. PICHER, a citizen of the United States of America, residing in Joplin, in the county of Jasper, in the State of Missouri, have invented a certain new and useful Improvement in Methods of Manufacturing Spelter from Zinc Ores Containing Lead, of which the following is a true and exact description.

My invention relates to the manufacture of spelter from zinc ores containing lead and sulfur, and has for its object the utilization of such ores for the economical production of zinc.

Heretofore zinc ores containing lead have not been considered suitable for the manufacture of spelter except when used in small proportion in admixture with other ores, because in reducing and volatilizing the zinc the lead present rapidly destroys the retorts and is also to a considerable extent carried over with the zinc into the condensing-chamber and alloyed with the spelter, greatly lessening its value. Where the lead in the retort is in the form of lead sulfate, as is generally the case, its sulfur combines with the zinc, causing a considerable loss of the zinc in addition to the other drawbacks to the use of such ores. My process of treating such ores consists in first eliminating the lead from the ore by treating it in contact with air in a subliming-furnace, carefully maintaining a temperature below that at which the zinc is volatilized. I then desulfurize the residue, and then after such intermediate treatments, if any, as may be necessary to bring the residue to proper condition treat it in retorts and in admixture with carbon to reduce and volatilize the zinc, which is of course condensed in the usual way. Where, as is generally the case, the zinc is in the form of sulfid or blende, the residue after the elimination of the lead is calcined to desulfurize and oxidize the zinc, which should be in the form of oxid when charged into the retorts wherein it is reduced and distilled, and where iron pyrites are present in the ore it can be readily separated from the zinc oxid after calcination by jigs or other gravity-separators, since the pyrites will be made porous and lighter owing to partial desulfurization in the calcining-furnace.

By preference I carry out the first step of my treatment in a furnace of the Scotch-hearth character, the ore being mixed with carbonaceous material and subjected to blasts of air in order to partly or wholly sublime the lead compounds, which, or the portion of which that are driven off, are in the form of a fume of lead sulfid and lead sulfate, with more or less lead oxid in admixture. This sublimation of the lead can be carried on energetically at temperatures below that at which the zinc is readily sublimed and with but little loss of zinc from sublimation, and the resultant cinder contains practically all the zinc of the ore free from a seriously-detrimental percentage of lead and in condition for successful treatment to make spelter. Precious metals, if present, are not affected by the elimination of the lead and will be left in the retorts after the zinc is distilled.

A material economy is attainable in my process by screening the fumes driven off in the treatment to eliminate the lead from the ore, by which means the entire lead contents is saved as a lead fume having a well-known commercial value.

I have successfully applied my process in the treatment of ores containing from one to ten per cent. of lead, and while it is perhaps not commercially necessary to so treat ores containing less than or even as much as one per cent. of lead my treatment can undoubtedly be advantageously applied to zinc ores containing even more than ten per cent. of lead.

In the drawings I have indicated diagrammatically, at the request of the Patent Office, the three types of furnaces employed in carrying out my invention.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The method of manufacturing spelter from zinc ore containing lead which consists in first eliminating the lead contents of the ore by heating it in contact with air to a temperature sufficient to sublime the lead but below that at which the zinc is sublimed in material quantity, then desulfurizing the residue and finally treating the desulfurized zinc residue in admixture with carbon in retorts to reduce and volatilize the zinc.

2. The method of manufacturing spelter

from zinc ore containing lead and iron pyrites which consists in first eliminating the lead contents of the ore by heating it in contact with air to a temperature sufficient to sublime the lead but below that at which the zinc is sublimed in material quantity, then desulfurizing the residue and rendering the pyrites porous by calcination, then separating the altered pyrites from the desulfurized residue and finally treating the residue in admixture with carbon in retorts to volatilize the zinc.

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Witnesses:
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