

UNITED STATES PATENT OFFICE.

PAUL GÜHRS AND ALBRECHT GÜHRS, OF BERLIN, GERMANY.

PROCESS OF MANUFACTURING ZINC ALLOYS.

No. 824,644.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, PAUL GÜHRS, 43 Graefestrasse, Berlin, German Empire, and ALBRECHT GÜHRS, 75 Plan-Ufer, Berlin, German Empire, manufacturers and subjects of the King of Prussia, have invented a certain new and useful process for manufacturing zinc with changed physical properties with exclusion of oxidation and preventing the formation of hard zinc, of which the following is a specification.

It is well known that in the melting of metallic zinc in pans or crucibles as heretofore practiced the formation of hard zinc is unavoidable. The so-called "hard zinc," of very objectionable physical properties, is formed in a very short time on melting metallic zinc in a pan or in a crucible and on keeping it liquid at a constant heat of about 500° centigrade. The formation of hard zinc takes place still more rapidly in the coating of pieces of iron, of metal sheets, and the like with liquid metallic zinc. The hard zinc thus formed destroys the casting properties and the fluidity of the zinc and renders it unfit for further working. Just as troublesome and noxious in the working of molten liquid zinc is the action of the extraordinary quick and strong oxidation. This formation of oxid results from the vaporization of zinc, which takes place on heating zinc to about 450° centigrade. In zinc-coating plants, for instance, the formation of hard zinc amounts to about twenty-five to thirty per cent. and the formation of oxid to about ten to fifteen per cent.

According to the process herein described it is possible to obviate these difficulties, the formation of hard zinc being entirely and the rapid and strong oxidation of the liquid metallic zinc being almost entirely eliminated, which is effected by incorporating aluminium and bismuth with the zinc-bath, so as to be retained therein.

The process is carried out as follows: In any suitable vessel, taepan, or the like metallic aluminium is fused, and thereupon an equal amount of zinc and a few tenths of one per cent. of metallic bismuth are added thereto, and the whole mass is then fused and preferably agitated. The metal alloy obtained is cast, preferably, in form of plates, bars, or ingots. Thereupon metallic zinc is fused in any suitable crucible, pan, or kettle at a tem-

perature of about 500° to 600° centigrade, together with the above-described alloy of zinc, aluminium, and bismuth. The latter is added in such quantities and for such time until the vaporization of the entire mass of zinc which has become fused together has ceased. For this purpose an amount of about 0.5 per cent. of aluminium and about 0.2 per cent. of bismuth in the zinc-bath is sufficient, as has been found by experiments.

As above stated, the aluminium and bismuth can be incorporated with the zinc by melting the zinc together—that is, at the same time—with the aluminium-zinc-bismuth alloy. On the ceasing of the vaporization of the metallic zinc the formation of hard zinc is at once entirely obviated, and at the same time the rapid and strong oxidation is also almost completely prevented. Obviously zinc from any source, such as zinc-scrap, may be worked according to this process.

Although by incorporating the aluminium and bismuth in the described manner the whole mass of these metals is retained in the zinc-bath, this latter does not differ essentially in its composition from that of ordinary crude zinc—smelter's zinc—because it consists of about ninety-nine per cent. of zinc, the aluminium and bismuth being present in such a small amount of not so great as one per cent. The zinc obtained according to the present process possesses very remarkable physical properties, which render it particularly of high value for zinc-coating and zinc-casting works.

What we claim, and desire to secure by Letters Patent of the United States, is—

1. The process of producing a zinc alloy, which consists in incorporating an alloy of aluminium-zinc-bismuth with zinc of any source.

2. The process of producing a zinc alloy, which consists in melting the zinc at the same time together with an aluminium-zinc-bismuth alloy.

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

PAUL GÜHRS.
ALBRECHT GÜHRS.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.