UNITED STATES PATENT OFFICE.

PAUL GÜHRS AND ALBRECHT GÜHRS, OF BERLIN, GERMANY.

PROCESS OF MAKING ZINC ALLOYS.

No. 804,006. Specification of Letters Patent. Patented Nov. 7, 1905.

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To all whom it may concern:

Be it known that we, PAUL GÜHRS, of 43 Graefestrasse, and ALBRECHT GÜHRS, of 75 Plan-Ufer, Berlin, German Empire, manufacturers, subjects of the King of Prussia, German Emperor, have invented a certain new and useful process for melting zinc and for changing the physical conditions of the same and preventing the formation of hard zinc and also for avoiding oxidation, of which the following is a specification.

The object of this invention is a process for manufacturing zinc for zinc-coating purposes which will neither form the so-called "hard zinc" nor oxid and by means of which exceedingly resistant durable coatings of zinc may be obtained. It has been ascertained that by incorporating aluminium with zinc the formation of hard zinc and of oxid may be prevented. In order to distribute and thoroughly incorporate the aluminium an alloy of zinc and aluminium is preferably made use of. With a view of arriving at a thorough and efficient incorporation of aluminium or of the alloy of zinc and aluminium it is necessary to melt the aluminium or the alloy of zinc and aluminium together and simultaneously with the zinc. In order to effect the simultaneous melting of aluminium and zinc, the melting has to be carried on in such a manner, for instance, that the aluminium is placed upon the bottom of the container and is covered with the zinc. The aluminium or respectively the alloy of aluminium and zinc may, however, be melted first, the zinc being then added to the molten mass. Such an amount of aluminium has to be incorporated with the zinc for preventing the formation of hard zinc and of oxid that there is no further formation of gas in the entire mass of the molten zinc.

While heretofore in the melting of zinc, even of the purest kind, part of the zinc assumed a glass-like brittle condition, which was usually designated as "hard zinc," thus constituting a loss for all technical purposes, this change does not take place if suitable quantities of aluminium are incorporated with the zinc in accordance with the present invention.

The results aimed at by the present invention can only be attained by first melting the aluminium and then adding the zinc. If the zinc is melted first and the aluminium is added thereafter, the results of the present process cannot be attained. About 0.5 to two per cent. of aluminium are incorporated, for instance. A small addition of a small percentage of tin—for instance, some few tenths of one per cent.—may also be added to the zinc in order to overcome its difficultly-melting properties, so that the zinc will then contain both aluminium and tin. Tin accomplishes very good results; but other metals which produce fluidity of the molten material may also be used. While aluminium renders the zinc more difficultly fusible, a percentage of aluminium and tin in the zinc will act to prevent the zinc from becoming difficultly fusible; but the mass remains thin and readily fluid. In consequence of the difficultly-fusing properties of zinc containing aluminium zinc does not become fluid enough when used for further operations—for instance, for casting purposes—and zinc coating produced with such zinc is too thick and presents uneven places. By the use of zinc which contains aluminium and tin good and durable zinc coatings may be obtained with most advantageous utilization of the zinc-bath. It has been found that zinc containing aluminium or aluminium and tin yields coatings in the zinc-coating operation which adhere better to the underlying surface. In the zinc coating of metal sheets the coating of zinc adheres to such an extent that when the sheet is bent the coating will not scale off. The metal sheets coated with zinc treated in this manner may be subjected to the action of rollers, hammers, stencils, and to any other treatment without the coating of zinc scaling off. Furthermore, the durability of soldering work in zinc plates effected with soft solder and of zinc coatings which consists of zinc treated in accordance with the present invention is considerably increased. It has also been found that for the coating of iron sheets with zinc a smaller quantity of metal is required than was necessary if the zinc does not contain a percentage of aluminium and tin.

The vessels used for melting and keeping the molten zinc are less attacked by the molten mass, provided it contains a small quantity of aluminium or of aluminium and tin, as compared with crude zinc which has not been submitted to the ordinary process.

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

The process of manufacturing a zinc alloy for the purpose of zinc coating, which consists in incorporating with zinc about 0.5 to two per cent. of aluminium and less than one per cent. of a metal producing great fluidity, in such a manner that the zinc does not melt before the aluminium.

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.