

UNITED STATES PATENT OFFICE.

JOHANNES CATHARINUS BULL, OF ERITH, COUNTY OF KENT, ENGLAND.

MANUFACTURE OF ALLOYS OF ZINC.

SPECIFICATION forming part of Letters Patent No. 412,016, dated October 1, 1889.

Application filed December 8, 1888. Serial No. 293,019. (No specimens.) Patented in England March 16, 1888, No. 4,086.

To all whom it may concern:

Be it known that I, JOHANNES CATHARINUS BULL, a subject of the King of Norway, residing at Erith, Kent, England, have invented certain Improvements in the Manufacture of Alloys of Zinc, (for which I have received Letters Patent in England, No. 4,086, March 16, 1888,) of which the following is a specification.

My invention relates to an improved process of producing alloys of zinc with the various other metals; and its object is to produce these alloys cheaply and to overcome the obstacles which have hitherto rendered the production of alloys of zinc with such metals as iron, manganese, &c., the fusing or melting points of which are above the temperature at which zinc volatilizes almost impossible.

Heretofore alloys of zinc with such metals as iron and manganese have been produced by digesting or immersing the metal—as iron—for a long time in a bath of molten zinc, whereby an alloy of zinc and iron will be produced; but the percentage of iron combined with the zinc in the alloy thus produced is very small. Berthier mentions nine and one-half parts in one hundred as the largest proportion of iron ever alloyed with zinc.

In making these alloys by my improved process I take advantage of the facts, first, that an addition of arsenic to the zinc raises the temperatures at which the zinc fuses and volatilizes to a degree corresponding to the proportion of arsenic added; and, second, that arsenic thus added to the zinc deoxidizes it, thereby greatly improving the alloys formed by abstracting the oxygen from any oxides present. The arsenic is added in such a proportion that it is all, or practically all, utilized in the deoxidation and does not remain in the final alloy.

In carrying out my improved process I combine the zinc with a quantity of arsenic sufficient for the purpose in a bath, preferably closed as nearly as possible in order to prevent access of air thereto. Arseniureted zinc is thus formed and the temperature of the

bath is kept as near as possible to the point at which volatilization takes place. I then introduce into the bath a proper quantity of iron or other metal to be combined with the zinc in order to produce the alloy. In some cases a small quantity of arsenic added to the iron proves beneficial by removing any oxygen contained therein. By this method I am able to produce an alloy of zinc and iron, for instance, of uniformity and richness unattainable by any other known process, and containing from 10 per cent. upward of iron combined with the zinc. By varying the proportions of zinc and arsenic I am able to raise the fusing and volatilizing points of the bath very considerably, whereby the zinc will combine with a much larger proportion of iron, and by this variation I can, within limits, combine the exact weights of metal desired.

I am aware that it is not new to combine zinc-iron alloys from galvanizing works with phosphorus, and notably with phosphuret of copper, and this I do not claim.

Having thus described my invention, I claim—

1. The herein-described process of making alloys of zinc and the more refractory metals—as iron, manganese, chromium and wolfram, for example—which consists in combining arsenic with the zinc, whereby arseniureted zinc is produced, and then while the temperature of the zinc is nearly at the point of volatilization adding to the bath of zinc the iron or other metal to form the alloy.

2. The herein-described process of making alloys of zinc and the more refractory metals—as iron, for example—which consists in first combining the respective metals with arsenic and then, while in a molten state, combining the said arseniureted metals with each other.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHANNES CATHARINUS BULL.

Witnesses:

H. H. NEWMAN,
A. E. LEOPOLD.