UNITED STATES PATENT OFFICE.

JOSEPH PATRICK, OF FRANKFORT-ON-THE-MAIN, GERMANY.

ALLOY.

SPECIFICATION forming part of Letters Patent No. 648,428, dated May 1, 1900.

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To all whom it may concern:

Be it known that I, JOSEPH PATRICK, a subject of the Queen of England, and a resident of Frankfort-on-the-Main, Germany, have invented certain new and useful Improvements in Alloys, of which the following is a specification.

It is well known that the addition of magnesium will render nickel more ductile than it is in its pure condition, and in order to attain this result it has hitherto been the practice to melt down the nickel to free it entirely from its slag and then to add the magnesium metal. This course, however, is not without certain drawbacks, as it is attended with risk of explosions, while it invariably leads to a somewhat serious loss of magnesium. Also in proceeding in the aforesaid manner it has been necessary to bring the nickel-bath prior to the addition of the magnesium to an accurately-determined temperature above its point of fusion, which determination of temperature is fraught with considerable difficulty. All these inconveniences are obviated by conducting the operations according to this invention, as follows:

To the pieces of nickel to be melted chlorid of magnesium is added, together with fluorspar and powdered charcoal, and the resulting mixture is melted in a crucible. A layer of slag forms over the melting nickel-bath, which layer, although not stiff, is very cohesive. The charcoal effects a reduction of the magnesium salt. A certain amount of chlorin is liberated and escapes, and the reduced magnesium enters the nickel-bath and forms an alloy with the nickel. In this manner a nickel alloy containing the desired percentage of magnesium is obtained safely at little cost and without the necessity of paying special attention to the temperature. It will of course be understood that other magnesium compounds may be similarly utilized, though chlorid of magnesium is preferred. By the aid of the bath thus prepared and of its cohesive layer of slag it is possible to produce an alloy of nickel and zinc whereof the percentage of zinc will by far exceed that which, in accordance with Heitmann's theory, (see his German patent, No. 9,405,) such an alloy has hitherto been deemed capable of attaining. The alloy resulting from the process described in that patent contains only ten per cent. of zinc, as a portion of the zinc used in the process volatilizes and does not combine with the other metal. To effect this, zinc pieces which have previously been heated are introduced into the bath, taking care to preserve the layer of slag intact, and are retained at the bottom thereof (which may be done by means of an iron rod) until they are dissolved in the bath of melted nickel. A quantity of zinc, more than double that hitherto combinable, may thus be added, and the peculiar nature of the layer of slag, as also the precaution of keeping the zinc down at the bottom, serve to prevent an escape of zinc vapors and enable the percentage of zinc in the alloy almost exactly to correspond to the theoretical quantity. These alloys of nickel are not so well fitted for the direct production of castings, but are admirably suited to the preparation of an alloy of nickel and copper, both moderate in price and fulfilling all technical requirements, the copper in this case being added to the nickel-bath (described in the introductory part of this specification) either before or after the addition of zinc.

The copper alloy obtained by this process will answer all purposes for which brass and tombac have been employed until now, over which metals it presents, however, the advantages of a better color, greater density and ductility, and an exceedingly-moderate cost, and it is also distinguishable from German silver by its considerably-less cost price and its finer color.

I claim—

1. The herein-described process for obtaining an alloy of nickel, magnesium and zinc, which consists in adding to nickel and a salt of magnesium, a flux adapted to form a cohesive slag and a reducing agent for said magnesium salt, melting the mixture, and introducing zinc into the molten mass and maintaining said zinc underneath the slag until it is melted.

2. The herein-described process for obtaining an alloy of copper, nickel, magnesium and zinc which consists in adding to nickel and a salt of magnesium, a flux adapted to form a cohesive slag and a reducing agent for

said magnesium, then melting the mixture, introducing zinc into the molten mass and maintaining said zinc underneath the slag until it is melted, and finally in adding copper to the molten nickel-magnesium mixture at any time with respect to the time of introducing the zinc.

3. The herein-described process for obtaining an alloy of nickel and magnesium, which consists in adding fluor-spar and powdered charcoal to nickle and magnesium chlorid, and melting the mixture.

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

JOSEPH PATRICK.

Witnesses:
DEAN B. MASON,
JEAN GRUND.