

# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN PREVENTING CRYSTALLIZATION AND BLOW-HOLES IN CASTING METALS AND THE ALLOY.

Specification forming part of Letters Patent No. **217,523**, dated July 15, 1879; application filed January 17, 1879.

### *To all whom it may concern:*

Be it known that I, THEODOR FLEITMANN, of Iserlohn, Prussia, have invented an Improved Process of Casting Metals, and the product derived therefrom, of which the following is a specification.

This invention relates to an improved process of casting metals, such as nickel, cobalt, and others, which are to be used for plating metals and alloys, and which are apt to crystallize and to form air-bubbles in the process of casting, and also to the alloy derived from such process.

The invention has for its object to prevent such crystallization and formation of air-bubbles in the casting process, and to render the alloy tenacious and of uniform consistency.

The invention consists, first, in a process of preventing crystallization and blow-holes in molten metals preparatory to casting, by adding thereto, after the slag has been removed, and while the metal is heated beyond the melting-point, a proportion of magnesium; secondly, in an alloy of nickel and magnesium united in the proportions of about two hundred parts of nickel to one part of magnesium, all as is hereinafter more fully described.

In carrying my invention into effect I proceed as follows: The nickel, cobalt, or other metal or alloy is melted in a crucible and heated to a considerable extent beyond its melting-point; otherwise the addition of magnesium would so thicken the mass as to render it incapable of flowing. The slag and impurities are then carefully removed through an opening in the crucible, and about one-half of one per centum of magnesium is then added to the mass—viz., about one part of magnesium to two hundred parts of melted metal; but a larger quantity of magnesium may be added. The magnesium should be added gradually and in small quantities, and after the addition of some coarse charcoal or the introduction of carbureted-hydrogen gas. The magnesium is thoroughly mixed with the molten mass by shaking the crucible, or in any other manner. The mixture is now ready to be poured.

The process will remain the same in substance when the metal is melted in a furnace instead of in a crucible.

The metal thus prepared will be found to

be free from air-bubbles, will not be crystallized, and will be tenacious and of uniform consistency.

In plating metals with the alloy of nickel or cobalt prepared as above described, I proceed as follows: The surface of the ingot to be plated is made to correspond exactly with one of the surfaces of the block or plate of the alloy of nickel and magnesium with which block the metal is to be plated, so that when the prepared nickel alloy and ingot are placed one upon the other, contact will be formed at every point of the continuous surfaces.

The proper preparation of surfaces may be effected by rolling, drilling, punching, or otherwise working the two metals.

Between the ingot and the nickel alloy is placed a small quantity of borax or equivalent material, and the two pieces are then subjected to heat and united by melting, rolling, or otherwise. The product thus obtained may be rolled or otherwise worked without injury to the plated surface.

Previous to my invention it was not possible to roll or work into shapes (otherwise than by cutting) metals that were plated with nickel. Instead of plating the ingot with the nickel alloy, as hereinabove described, it may be plated with an alloy of cobalt and magnesium.

The new alloy is more pliable than the nickel, but retains the same advantage of appearance and non-oxidation which pure nickel possesses.

I claim—

1. The process herein described of preventing crystallization and blow-holes in molten metal preparatory to casting, by adding thereto, after the slag has been removed, and while the metal is heated beyond the melting-point, a proportion of magnesium, substantially as specified.

2. The alloy of nickel and magnesium, united in the proportions of about two hundred parts of nickel to one part of magnesium, substantially as specified.

This specification signed by me this the 29th day of November, 1878.

DR. THEODOR FLEITMANN.

Witnesses:

FRIEDRICH CARL GLASER,  
CARL T. BURRHARDT.