

UNITED STATES PATENT OFFICE.

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PROCESS OF MAKING ALLOYS.

SPECIFICATION forming part of Letters Patent No. 572,092, dated November 24, 1896.

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To all whom it may concern:

Be it known that I, ERNEST AUGUSTE GEORGES, (called CHARLES STREET,) a citizen of the Republic of France, and a resident of Paris, (Seine,) in said Republic, have invented certain new and useful Improvements in the Manufacture of Alloys, of which the following is a full, clear, and exact description.

This invention relates to a process which permits the introduction, in desired proportions, into the fused masses of different metals or alloys, of solid metallic chromium or solid alloys of chromium with such metals as molybdenum, tungsten, uranium, &c., the chromium and the metals alloyed therewith being chemically pure and obtained, for example, in the electrolytic way.

Attempts have heretofore been made to prepare alloys analogous to those just referred to, but in all these attempts the chromium, molybdenum, &c., has always been employed, not in a chemically pure state, but combined with other bodies. Thus, for example, the alloy of aluminium or of tungsten has been prepared by heating a mixture of WO_3 Al with cryolite, chlorid of sodium, and chlorid of potassium. Similarly, alloys have been prepared with the carbids of the metals hereinbefore indicated by directly adding these carbids; but the alloys thus produced are brittle and cannot be worked.

The object of the present invention is to obtain alloys of the pure metals enumerated above by directly adding the desired proportions of said metals or alloys in the solid state to the fused metal or metals which form the other element or elements of the alloys and by incorporating them with these latter by dissolution. Numerous experiments made for this purpose have proved that this method presents serious difficulties by reason of the particular characteristics of the metals of the chromium group in the pure state, these characteristics being a high fusing-point and a low oxidation-point, so that the process adopted for ferric carbids or the combinations thereof is not practical. Thus, for example, fragments of pure metallic chromium added to a mass of fused aluminium appear

intact at the bottom of the ingot, being protected by the formation of the coat of chromium oxid, which prevents the dissolving action of the metallic chromium, even after a prolonged heat. Similar results are obtained by heating together aluminium and chromium with cryolite and sodium chlorid, or by pouring fused aluminium upon fragments of chromium placed in a crucible.

I have discovered that the solution of the pure metals or alloys enumerated above can be effected by covering the fragments of the metal with a protecting-coat, which prevents the oxidation of the surface at the moment of contact with the fused metal.

In accordance with the present invention a protecting-coat is formed of a substance or flux having a sufficiently high boiling-point, such, for example, as fused cryolite and borax, with which the chromium or like metal is incorporated before being brought into contact with the fused metal.

Fragments of chromium are allowed to fall, for example, into a crucible containing a quantity of melted cryolite sufficient to cover the chromium. The oxid, if any, which may be formed is dissolved by the flux, and by adding fused aluminium, either immediately or after the flux has been allowed to solidify, a sufficiently intimate metallic contact is established between the chromium and the aluminium to effect the solution of the former; or the foreign metal or alloy incorporated with the flux may be added to the fused metal.

A third mode consists in adding a suitable flux, such as borax, cryolite and sodium chlorid, or fluor-spar, to the fused metal, so that the said flux floats on such metal as a liquid layer. The fragments of the foreign metal or alloy are added to the fused mass, and by passing through the layer of flux they are protected against oxidation at the moment of contact with the molten metal. The necessary thickness of the layer of flux will depend upon the dimensions of the fragments introduced.

I claim as my invention or discovery—

The process herein described of making alloys of metals of the chromium group with

other metals, said process consisting in melting the more fusible metal, introducing the chromium or similar metal and causing its solution in the fused metal, protecting the
5 former at the moment of its introduction by a solidified coating or layer of flux completely preserving it from contact with the atmosphere, the flux being of such a nature as to eliminate the small quantity of oxid that may
10 have formed, as set forth.

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

ERNEST AUGUSTE GEORGES,
(CALLED CHARLES STREET.)

Witnesses:

CLYDE SHROPSHIRE,
EDOUARD BARBARY.