

UNITED STATES PATENT OFFICE.

FRANCIS ALPHIA COTHIAS, OF IVRY-PORT, FRANCE.

ALLOY.

SPECIFICATION forming part of Letters Patent No. 586,163, dated July 13, 1897.

Application filed April 2, 1897. Serial No. 630,447. (No specimens.) Patented in France June 2, 1896, No. 256,852; in Belgium June 30, 1896, No. 122,223; in England June 30, 1896, No. 14,479; in Austria July 31, 1896, No. 46/3,442; in Italy July 31, 1896, No. 42,221; in Luxembourg July 31, 1896, No. 2,582, and in Spain July 31, 1896, No. 19,417.

To all whom it may concern:

Be it known that I, FRANCIS ALPHIA COTHIAS, a citizen of the Republic of France, residing at 9 Rue Victor Hugo, Ivry-Port, Seine, in the Republic of France, have invented certain new and useful Improvements in Alloys, of which the following is a full, clear, and exact specification.

The invention has been patented in France, No. 256,852, dated June 2, 1896; in Belgium, No. 122,223, dated June 30, 1896; in Austria, No. 46/3,442, dated July 31, 1896; in Italy, No. 42,221, dated July 31, 1896; in Luxembourg, No. 2,582, dated July 31, 1896; in England, No. 14,479, dated June 30, 1896, and in Spain, No. 19,417, dated July 31, 1896.

The invention forming the subject of this application relates to a new metallic alloy and process of making the same. This alloy has considerable tensile strength. Its resisting force is as high as thirty-five kilograms per square millimeter of section. It can be soldered and worked with the greatest ease. It consists of a mixture, in given proportions, of copper, tin, zinc, and lead, to which I add chlorid of ammonia and phosphorus in the state of salt.

The composition of this alloy is as follows: copper, one hundred and sixty grams; tin, fifty grams; zinc, seven hundred and fifty grams; lead, forty grams; total, one thousand grams.

This alloy is especially intended for the manufacturing of ordinary pieces of machinery. It is an advantageous substitute for brass and cast-iron. It enables me to obtain pieces of this kind completely finished on leaving the mold.

To manufacture this alloy, I proceed as follows: I begin by putting into a crucible the requisite quantities of copper and tin and I let them melt together. In this way I obtain a first alloy of copper and tin, to which, after cooling, I add the necessary quantity of zinc and lead, and then I let the whole mass melt together once more. The substances are thereby thoroughly combined and I obtain a perfectly-homogeneous alloy.

In order to facilitate the combination of the

various elements and reduce the oxids that will form at every melting, I add during the last manipulation about a kilogram of chlorid of ammonia per one thousand kilograms of alloy. I add also during the last manipulation a small quantity of phosphorus, in order to give to the alloy an easier flow and greater fluidity. This phosphorus can be used in the state of salt. These salts are phosphides of titanium, manganese, wolfram, tungsten, &c., which further increase the hardness of the alloy.

When the alloy is completely melted it is cast into ingot-molds, & herein it is left to cool.

To make perfectly sure that the composition of the alloy is rigorously correct, a sample is taken and analyzed, and if found that the requisite proportions do not exist the alloy is melted over again and such material added as is necessary to give to the mass the requisite composition.

The various metals used to increase the resisting force and hardness of alloys (titanium, manganese, wolfram, tungsten, &c.) are added in the state of salts (chiefly in the state of phosphides) to the mixture either during the last melting or during a remelting of the ingot performed after the last casting and the taking of the samples. The alloy obtained in the way described above is fusible at a temperature below 800° centigrade. It is sufficient to heat it in kettles in the open air, exactly like lead or tin, and without either furnaces or crucibles being required.

The alloy molds itself perfectly in metal molds.

I claim —

The described alloy consisting of copper one hundred and sixty parts; tin fifty parts; zinc seven hundred and fifty parts and lead forty parts.

In witness whereof I have hereunto set my hand in presence of two witnesses.

FRANCIS ALPHIA COTHIAS.

Witnesses:

EMILE BERT,

EDWARD P. MACLEAN.