UNITED STATES PATENT OFFICE.

ALPHA FRANCIS COTHIAS, OF IVRY-SUR-SEINE, FRANCE.

ALLOY.

SPECIFICATION forming part of Letters Patent No. 589,935, dated September 14, 1897.

Application filed July 31, 1896. Serial No. 601,289. (No specimens.) Patented in France June 2, 1896, No. 256,852; in Belgium June 30, 1896, No. 122,226; in England June 30, 1896, No. 14,479; in Austria July 31, 1896, No. 3,442; in Spain July 31, 1896, No. 19,417; in Hungary July 31, 1896, No. 7,324; in Italy July 31, 1896, No. 42,221; in Luxemburg July 31, 1896, No. 2,582, and in Portugal August 1, 1896, No. 2,276.

To all whom it may concern:

Be it known that I, ALPHA FRANCIS COTHIAS, manufacturer, a citizen of the Republic of France, and a resident of 9 Rue Victor-Hugo, Ivry-sur-Seine, France, have invented certain new and useful Improvements in Alloys, of which the following is a specification.

This invention has been patented in the following countries: France, No. 256,852, dated June 2, 1896; England, No. 14,479, dated June 30, 1896; Austria, No. 3,442, dated July 31, 1896; Belgium, No. 122,226, dated June 30, 1896; Spain, No. 19,417, dated July 31, 1896; Hungary, No. 7,324, dated July 31, 1896; Italy, No. 42,221, dated July 31, 1896; Luxemburg, No. 2,582, dated July 31, 1896; and Portugal, No. 2,276, dated August 1, 1896.

The invention forming the object of this application for patent relates to a new metallic alloy and process of making the same.

This alloy has great 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 facility. It consists of a mixture, in given proportions, of copper, tin, zinc, and aluminium, 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 eighty grains; tin, one hundred and fifty grains; zinc, six hundred and sixty grains, and aluminium, ten grains; total, one thousand grains. An alloy in these proportions and prepared after the manner described with additions of chlorid of ammonia and phosphides is especially suitable for the casting of pieces of machinery required to present great resistance and to resist friction, like bearings. It enables me also to obtain pieces of this kind completely finished on leaving the mold.

For manufacturing this alloy I proceed in the following manner: I begin by putting into a crucible the requisite quantities of copper and tin and I let them melt together. In this manner I obtain a first alloy of copper and tin, to which I add the necessary quantity of zinc. Then I let the whole mass melt together once more. When the mass is completely molten, I let it cool down until it becomes pasty. I then add the requisite proportions of aluminium, which immediately heightens the temperature of the mass, and finally I heat the mass to a very high temperature. The substances are thereby combined in the most complete manner, and I obtain a perfectly homogeneous alloy. In order to facilitate the combination of the various elements and reduce the oxids that form at every melting, I add during the last manipulation about a kilogram of hydrochlorate 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 more 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 molten, it is cast into ingot-molds, wherein 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 it is found that the requisite proportions do not exist the alloy is melted 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 (titane, manganese, wolfram, tungsten, &c.) are added to the mixture in the state of salts (chiefly in the state of phosphides) either during the last melting or during a remelting of the ingot performed after the first casting and the taking of the samples.

The alloy obtained in the way described above is fusible at a temperature below eight hundred degrees centigrade. It is sufficient to heat it in kettles in the open air, exactly like lead or tin and neither furnaces or crucibles are required.

This alloy molds itself perfectly in metal molds.

I claim—

1. The process herein described consisting of the melting together of copper and tin, adding, during the melting, zinc, remelting and letting the mass cool down to the consistency of paste; adding aluminium and hydrochlorate of ammonia and also phosphides.

2. The composition herein described consisting of copper one hundred and eighty grains; tin one hundred and fifty grains; zinc six hundred and sixty grains and aluminium ten grains.

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

ALPHA FRANCIS COTHIAS.

Witnesses:
EMILY ZEST, Jr.,
EDWARD P. MACLEAN.