UNITED STATES PATENT OFFICE.

EDMUND A. C. DU PLAINE, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN ALLOYS TO BE USED WITH OTHER ALLOYS.

Specification forming part of Letters Patent No. **209,240**, dated October 22, 1878; application filed March 4, 1878.

To all whom it may concern:

Be it known that I, EDMUND A. C. DU PLAINE, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Composition for Metallic Alloy; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same.

The nature of my invention consists in a composition for metallic alloy, to be used as an ingredient in other alloys for various purposes, as will be hereinafter more fully set forth.

This composition consists of one hundred parts of grain or copper clippings, one hundred parts of grain-nickel, three parts of arsenic, three parts of phosphorus.

This mass is melted together, first the copper, and then add the nickel in small quantities, and then the arsenic, using some niter as a flux with pulverized charcoal to unite the metals. Then to the melted mass I add the phosphorus in small quantities, stirring well and covering with charcoal. I then add the flux, made of one part niter, one part borax, one part prussiate of potash, five parts lime, mixed well together with charcoal. This is thrown by handfuls in the heated metal, constantly stirring the same.

The arsenic and phosphorus are added separately, and the niter, borax, potash, lime, and charcoal in a pasty mass. When properly smelted, the melted metals are drawn from the fire and poured into ingots, forming a temper, which I call nickel bronze or temper, to mix with other alloys, as may be required, as, for instance, the following: For tough hard gun-metal I use one hundred parts lake copper, twenty-five parts temper, one part pure spelter. In this alloy I save the tin heretofore known in gun-metal, and make a stronger alloy.

In marine and locomotive engines I use eighty to ninety parts copper, fifteen to twenty parts nickel temper, one-half to one part pure spelter, and to this mass, melted, I add one-fourth part soft pure cast-iron, if to be used on crank-pins or guide-brasses.

For steam-valves I use ninety parts copper, fifteen parts nickel temper, five parts spelter, five parts lead.

For plumbers' cocks, &c., I use eighty parts copper, ten parts nickel temper, ten parts spelter, five parts lead.

For coal and mining pumps and acid waters I use one hundred and ten parts copper, twenty-five parts nickel temper, ten parts tin, two parts lead.

For propeller-wheels I use one hundred parts copper, fifteen parts nickel temper, five parts tin, five parts spelter, five parts lead.

For rail-car-wheel bearings I use one hundred parts copper, twenty-five parts nickel temper, ten parts tin and spelter melted together and poured in the crucible.

For anti-friction metals I use one hundred parts Banca tin, twenty parts nickel temper, as a standard for the best anti-friction metals, and then add lead and antimony to suit prices or requirements of customers.

For white brass to take the place of other brass I use seventy parts spelter, fifteen parts nickel temper, five parts antimony.

For pewter and high-polished metals I use twenty-five parts nickel temper, one hundred parts Banca tin, five parts antimony, or, if a cheaper alloy is required, seventy parts spelter, one hundred and ten parts lead, fifteen parts antimony, fifteen parts nickel temper.

In my nickel temper the arsenic hardens the copper the same as tin, and, according to the quantity used, produces white alloy with copper only.

The phosphorus I use for two purposes: First, it renders copper more fusible and causes it to flow more liquid, and makes sharper castings in small work. It also renders the grain closer, and has a strong affinity for the iron always found in copper of commerce, and it destroys this iron or causes it to remain in the bottom or sides of the crucible when melted.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The within-described composition for metallic alloy, consisting of one hundred parts copper, one hundred parts nickel, three parts arsenic, and three parts phosphorus, substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

EDMUND A. C. DU PLAINE.

Witnesses:

GEO. H. BOWER,
HUGH FRANKLIN KENNEDY.