

UNITED STATES PATENT OFFICE.

JESSE JONES, OF WILMERDING, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

ALLOY.

998,777.

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No Drawing.

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To all whom it may concern:

Be it known that I, JESSE JONES, a citizen of the United States, and a resident of Wilmerding, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Alloys, of which the following is a specification.

My invention relates to alloys and particularly to alloys the principal constituent elements of which are copper and zinc.

The object of my invention is to provide a composition or alloy to be cast, forged or otherwise formed into articles and machine elements which shall have an exceptionally high degree of resistance to any and all strains to which they may be subjected.

I have found, by experiments and tests, that if magnet or high speed tool steel or other special steel containing, as an ingredient, chromium, tungsten, molybdenum, titanium or vanadium, etc., in proper proportions, is added to an alloy of copper and zinc, the resulting composition has extraordinary properties, as regards tensile strength, elasticity, etc., that are not found in any other alloys of which I have knowledge. In addition to the metals above specified, I may add small quantities of aluminum, tin and manganese or, in certain cases, the aluminum and tin may be omitted.

Alloys have heretofore been made from certain of the above-mentioned metals, but the results have not been generally satisfactory, by reason of the high temperature which it was necessary to employ in melting the necessary ingredients and the readiness with which some of them oxidized and became eliminated, thereby making it well-nigh impossible to obtain uniformity of product.

In manufacturing the alloy which constitutes my invention, I employ a hardener composed of tin, ferro-manganese and magnet or high speed tool steel or some other special steel, preferably in the form of small crop ends or turnings, these constituent elements of the hardener being preferably combined in substantially the proportions of 30, 7½ and 62½ by weight, although such proportions may be considerably varied, in practice. I then combine from fifty-one to sixty-four parts of copper, from thirty-five to forty-five parts of zinc, from one-sixth of one part to fifteen parts of the hardener

above specified, from one-sixth of one part to three parts of tin, and from one-sixth of one part to eight parts of aluminum, in case the composition or alloy is required for castings.

The high speed tool steel which I propose to employ as one of the constituent elements of my new alloy consists of approximately 80% iron, 18% tungsten and 2% chromium, but variations from these percentages are of course permissible. The magnet steel which I propose to employ consists of approximately 95% iron and 5% tungsten, but these percentages may also be varied somewhat, if desired.

In case the alloy is intended for forging or rolling into bars, sheets, etc., the tin will generally be omitted and the aluminum may or may not be omitted.

In combining the constituent parts of my alloy, I melt the hardener and the copper in separate crucibles, and in connection with suitable fluxes, and then mix them. The addition of the other constituent metals may be then made in the usual well-known manner for making composite alloys. After the mixture is complete, the alloy is poured into suitable molds to form ingots and may be then re-melted and either poured into molds suitable for the castings desired or into slabs or billets, in case forgings or rolled articles are desired.

The method of combining the constituent parts of the alloy may, of course, be varied from what is above described, within reasonable limits, and the proportions of the parts may also be varied, the essential constituent which is always present, but the proportion of which may be varied, consisting of a hardener composed of some special high grade steel and manganese.

I claim as my invention:

1. An alloy containing copper, zinc, manganese and steel having tungsten as one of its constituent elements.

2. An alloy containing copper, zinc, manganese, tin and steel having tungsten as one of its constituent elements.

3. An alloy containing copper, zinc, manganese, tin, aluminum and steel having tungsten as one of its constituent elements.

4. An alloy containing fifty-one to sixty-four parts of copper, thirty-five to forty-five parts of zinc, and one-sixth of one part to

fifteen parts of a mixture of ferro-manganese and steel having tungsten as one of its constituent elements.

5 5. An alloy containing fifty-one to sixty-four parts of copper, thirty-five to forty-five parts of zinc, one-sixth of one part to three parts of tin, and one-sixth of one part to fifteen parts of a mixture of ferro-manganese and steel having tungsten as one of
10 its constituent elements.

6. An alloy containing fifty-one to sixty-four parts of copper, thirty-five to forty-five parts of zinc, one-sixth of one part to

three parts of tin, one-sixth of one part to eight parts of aluminum, and one-sixth of one part to fifteen parts of a mixture of ferro-manganese and steel having tungsten as one of its constituent elements.

In testimony whereof, I have hereunto subscribed my name this 21st day of November, 1904.

JESSE JONES.

Witnesses:

BIRNEY HINES,
J. C. MORSE.