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NONFERROUS ALLOY.

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To all whom it may concern:

Be it known that I, ROLAND NORTHOVER, a British subject, and residing at 210–219 Caxton House, Westminster, London, S. W. 1, England, have invented certain new and useful Improvements Relating to Nonferrous Alloys, of which the following is a specification.

This invention relates to non-ferrous metallic alloys and their production and use for turbine blading and the like.

It has been found that turbine blades, for example those used in steam turbines for ship propulsion, are liable to failure in time under the severe conditions of stress arising and the high temperature they are subjected to, while with the increased introduction of superheating these conditions become more exaggerated and more difficult to meet reliably. Now I have found that certain special bronzes possess the special characteristic of maintaining approximately the same order of elastic limits when submitted to temperatures about those of superheated steam as used in steam turbines as when tested in the cold state, while retaining a hard surface.

The invention consists in an alloy for such purposes having an approximate composition as follows:—

Pure copper	About 89 per cent.
Nickel	About 5 to 9 per cent.
Aluminium	About 3 to 1 per cent.
Manganese	About 2 to .5 per cent.

The invention also consists in turbine blades adapted to maintain their strength at high temperatures made by drawing, rolling, swaging or the like from an alloy of the above approximate composition and then submitting it to a suitable heat treatment of the character indicated below.

In carrying the invention into effect in one form by way of example, I utilize electrolytic copper and prepare the desired alloy by the use of a manganese-copper alloy containing 20 per cent manganese and from 3 per cent to 5 per cent of iron. The constituents of an example of the alloy thus are:—

	Per cent.
Electrolytic copper	87
Nickel	7
Aluminium	3
Manganese-copper containing about 20% of maganese and 3% to 5% of iron	3

The copper, nickel and manganese-copper are melted together in a crucible at a fairly high temperature, the other constituent, aluminium, being added to this molten alloy and thorough mixing being effected by stirring, a cryolite flux being preferably used. The melt is poured into a chill mould of suitable diameter for rolling the required section. The bar or the like is then rolled to shape, preferably hot, and when finished the blading is submitted to a suitable heat treatment. This heat treatment conveniently consists in raising the material to a temperature of about 500° to 700° C. and maintaining this temperature for a suitable time and then cooling preferably slowly.

This material has an elastic limit at 300° to 400° C. of about 18 to 20 tons.

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

An alloy for turbine blades and the like containing aproximately 89 per cent copper, from 5 to 9 per cent nickel, from 3 to 1 per cent aluminium and from 2 to 0.5 per cent manganese.

In testimony whereof I have signed my name to this specification.

ROLAND NORTHOVER.