

UNITED STATES PATENT OFFICE

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NICKEL-COBALT HEAT-RESISTING ALLOY

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3 Claims. (Cl. 75-171)

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This invention relates generally to alloys having a high degree of resistance to the combined and continued action of intense heat and stress, and particularly relates to alloys which are used in the construction of gas turbine parts.

The gas turbine type of engine consists mainly of a shaft having mounted thereon an air compressor and a hot gas turbine, the rotation being imparted to the engine by the action of the hot gases upon the gas turbine during expansion. The heat of the flaming gases, acting upon the blades and buckets, causes the corrosion and rupture of the metal used in their manufacture in a comparatively short time. It may, therefore, be safely stated that the development of the gas turbine depends upon the development of proper alloys to withstand the intense heat involved in its operation.

It is therefore the object of this invention to provide an alloy which will withstand intense heat and stress for a long period of time.

A more specific object of this invention is to provide an alloy which will withstand high mechanical stress at a temperature of 1500° F. or more for a comparatively long period of operation.

With these objects in view the present invention consists in an alloy comprising cobalt, chromium, nickel, copper, molybdenum, boron, iron and one or more modifiers, selected from a class consisting of columbium, vanadium and titanium.

Two formulae which exemplify the present invention and which have produced very satisfactory results are as follows:

	Per cent
Cobalt	50
Chromium	25
Nickel	10
Molybdenum	5
Copper	5
Iron	3.75
Boron	2.5
Columbium	1
Cobalt	30
Chromium	30
Nickel	25
Molybdenum	1
Copper	3
Iron	7.75

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	Per cent
Boron	.25
Columbium	1
Vanadium	1
Titanium	1

From the above it will be noted that using a combination of cobalt, chromium, nickel, molybdenum, copper, iron and boron, the following modifiers may be added either singly or in combination, or in various selected groups:

Columbium
Vanadium
Titanium

The ingredients of the improved alloy may be varied at least within the following ranges:

	Per cent
Co	25-55
Cr	20-35
Ni	5-30
Mo	.5-6
Cu	2-6
Fe	2-7.75
B	.1-.3
Modifier	.5-1.5

The foregoing description is given by way of example and it will be understood that the ingredients and proportions may be varied to suit requirements within the scope of the appended claims.

What I claim is:

1. An alloy adapted for use in the making of gas turbine parts and characterized by high heat and stress resistance, which consists of the following components in the proportions by weight of cobalt 25 to 55%, chromium 20 to 35%, nickel 5 to 30%, molybdenum 0.5 to 6%, copper 2 to 6%, iron 2 to 7.75%, boron 0.1 to 0.3%, and from 0.5 to 1.5 of at least one metal selected from a class consisting of columbium, vanadium and titanium.

2. An alloy adapted for use in the making of gas turbine parts and characterized by high heat and stress resistance, which consists substantially of the following components in the proportions by weight of cobalt 50%, chromium 25%, nickel 10%, molybdenum 5%, copper 5%, iron 3.75%, boron 0.25% and columbium 1%.

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3. An alloy adapted for use in the making of gas turbine parts and characterized by high heat and stress resistance, which consists substantially of the following components in the proportions by weight of cobalt 30%, chromium 30%, nickel 25%, molybdenum 1%, copper 3%, iron 7.75%, boron 0.25%, columbium 1%, vanadium 1% and titanium 1%.

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