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ALLOY

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3 Claims. (Cl. 75—171)

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This invention relates generally to alloys, but has reference more particularly to alloys which are especially adapted for hard facing purposes as well as for use in the form of castings.

In my U. S. Patents Nos. 2,396,552 and 2,458,502, there are described alloys which contain as their principal constituents, nickel, chromium and tungsten, the alloys, due to the fact that their nickel content is always in excess of their chromium content, and their tungsten content is in excess of 10%, being especially useful for hard facing valves, valve seats, as well as for other applications or uses in which abrasion and wear at relatively high temperatures are encountered. The alloys are particularly resistant to the attack of lead oxide and other lead compounds found in or resulting from the combustion of so-called leaded gasolines and similar fuels used in internal combustion engines.

I have discovered that under some conditions, where cost is a factor, and a somewhat lesser degree of resistance to the attack of lead oxide and other lead compounds is permissible, as in valves and valve seats for ordinary passenger automobiles, that an alloy similar to those described in my aforesaid patents, but containing smaller amounts of tungsten, can be satisfactorily used.

The alloy, in accordance with this invention, contains the following constituents or elements:

	Permissible Range	Preferred Alloy
		Per cent
Nickel	More than 35% and up to 70%	52
Chromium	More than 25% and less than 40%	31
Tungsten	More than 4% and less than 9%	6
Cobalt	Up to 12%	4
Carbon	1–3.5%	2
Iron	Balance but not more than 10%	5
		100

It is important that the nickel content of the alloy, in all cases, be in excess of the chromium content of the alloy.

While it is stated that the alloy may contain cobalt in amounts up to 12%, it is preferred that the cobalt content be maintained as low as possible, that is, in amounts not in excess of about 7%. The specific effect of cobalt in the alloy is to improve the weldability of the alloy, but this is at the expense of other properties, more specifically the resistance of the alloy to lead-oxide corrosion at elevated temperatures.

While a carbon range of from 1% to 3.5% has been indicated, in most cases a carbon content of from about 1.75% to about 2.75% is preferred, a particularly desirable hardness of the alloy being attained within this preferred carbon range. With less than 1% carbon, the weldability of the alloy decreases very sharply.

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While the balance of the alloy is stated to be iron in amounts less than 10%, it is preferred to maintain the iron content below 6%.

The presence in the alloy of manganese, in any appreciable amount, materially affects the resistance of the alloy to lead-oxide corrosion, so that manganese is expressly excluded from the alloy.

Alloys made in accordance with the invention are particularly resistant to the attack of lead oxide and other lead compounds found in or resulting from the combustion of the so-called leaded gasoline, and for this reason are especially adapted for the hard-facing of valves and valve seats in internal combustion engines which utilize such fuels, as well as for other structural elements of a similar nature.

While the utility of the alloy for hard-facing purposes has been emphasized, it is to be understood that the alloy may also be utilized for making castings in which the advantageous properties of the alloy are desired.

This application is a continuation-in-part of my co-pending application, Serial No. 22,261, filed April 20, 1948, now abandoned.

Having thus described my invention, I claim:

1. A structural element having at least a part which in use is subjected to abrasion and wear at elevated temperatures, and which is capable of resisting the corrosive action of lead oxide at those temperatures, said part comprising an alloy containing more than 35% and up to 70% nickel, more than 25% but less than 40% chromium, more than 4% but less than 9% tungsten, cobalt in amounts up to 12%, and from 1% to 3.5% carbon, the balance of the alloy being iron, but the iron being not in excess of 10%, and the nickel being always in excess of the chromium.

2. A structural element having at least a part which in use is subjected to abrasion and wear at elevated temperatures, and which is capable of resisting the corrosive action of lead oxide at those temperatures, said part comprising an alloy containing about 52% nickel, about 31% chromium, about 6% tungsten, about 4% cobalt, about 2% carbon, and about 5% iron.

3. A structural element, as defined in claim 2, said element being a valve.

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No references cited.