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ALLOY FOR DENTAL USE

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ABSTRACT OF THE DISCLOSURE

An alloy for use in dentistry comprising nickel, chromium, molybdenum, aluminum, beryllium and carbon; which alloy possesses physical properties adapting the same for effective replacement of the heretofore utilized gold and gold alloys. Said alloy is of marked strength while being relatively lightweight so as to provide relatively thin restoration devices while assuring of a precise and accurate fit.

BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates in general to metal alloys and, more particularly, to a uniquely constituted alloy adapted for dental usage.

It is an object of the present invention to provide an alloy comprised of so-called nonprecious metals, the usage of which will obviate the utilization of gold and alloys thereof for crown and bridge work, as well as related dental purposes.

It is a further object of the present invention to provide an alloy of nonprecious metals for making dental restorations, such as complete crowns, which is peculiarly adapted for reliably receiving porcelain veneers, as through baking.

It is a still further object of the present invention to provide a metal alloy of the type stated which, by obviating the heretofore accepted resort to use of gold and alloys thereof, conduces to a substantial economy which has long been awaited in the dental field.

It is another object of the present invention to provide an alloy of the character stated having physical properties equal or exceeding the corresponding properties of casting gold in all of its conditions of relative hardness so that the use of the present alloy causes no diminution to the individual in those advantages which had been heretofore assumed peculiar to gold.

It is another object of the present invention to provide an alloy of the type stated which is readily worked by the dentist so as to permit utilization of well known techniques.

It is another object of the present invention to provide an alloy of nonprecious metals which may be produced by an inexpensively performed method; the use of which is reliable and durable and conduces to precise and accurate fits.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In essence, this invention comprises a multi-metal alloy in which the major component is nickel and which embodies relatively lesser amounts of chromium, molybdenum, aluminum, and beryllium, together with a relatively small amount of carbon. It has been found that the

incorporation of these specific elements within the alloy is critical, although certain variations in relative proportions, as by weight, is permitted without appreciable diminution in the resultant properties.

The broad composition of this present alloy is as follows:

	Percentage by weight
Carbon	.03–.3
Beryllium	.3–3.5
Aluminum	.5–5
Molybdenum	.4–4
Chromium	8–20
Nickel	Balance

However, an alloy prepared in accordance with the present invention and having the following specific composition has been extensively tested and proved of marked efficacy:

	Percentage by weight, approx.
Carbon	.1
Beryllium	1.5
Aluminum	3.0
Molybdenum	2.0
Chromium	12.0
Nickel	81.4

Alloys prepared in accordance with the foregoing have been demonstrated to have the following physical properties:

Density	7.8.
Brinell hardness	276.
Proportional limit	55,000 lbs. per sq. inch.
Tensile strength	110,000 to 115,000.
Elongation	2%.

A study of the comparable properties of gold and the various gold alloys heretofore used in dentistry, including all of the grades of relative hardness of such gold, reveals that the alloy of this invention provides properties of greater value than gold.

In actual practice, the present alloy as used for making dental restorations, such as so-called complete crowns, as well as standard dental castings, such as inlays and onlays, and bridges, has produced myriad, unexpected advantages, including providing the construction of stronger, more rigid and long span bridges; allowing for relatively thinner construction of crowns; being actually less bulky and, hence, relatively more sanitary by permitting more anatomical interproximal space between abutments and pontics; and provides a more accurate and precise fit. In addition for dental prothesis, the present alloy provides a more permanent, non-tarnishing luster, while being of relative lightweight. Furthermore, it has been discovered that the relative hardness of crowns and the like formed of this alloy obviates the heretofore professional besetting problem of loss of centric due to wear. Actually, the wear by attrition factor of this alloy is approximately equal to that of the average natural tooth.

Another unexpected aspect from the use of the present invention in dentistry is that the same provides sufficient amount of burnishing and spinning without breaking or flaking for tight margins. The relative high tensile strength of the alloy maintains the requisite cohesiveness of the ingredients so that the metal alloy can be moved and subsequently polished without flaking or breaking.

In addition to the above described properties, this alloy may be effectively worked by the dentist utilizing presently known techniques and allows of the reliable application of porcelain facings or veneers. Heretofore, on only certain types of gold alloys has it been possible to bake porcelain. Of extreme importance is the fact that this alloy may be gold plated for enhancing the appearance of the porcelain veneer and acrylic veneers may be used in the customary manner.

In view of the foregoing it is thus apparent that restorations constructed of the present alloy can be relatively thinner than those made of gold and gold alloy, but with no diminution in strength. Accordingly, less time may be spent in preparation and with diminished destruction of tooth structure. Of especial importance it is the economic factor since the cost of this alloy is but a minor fraction of that for gold or gold alloy as currently used in dentistry.

The alloy may be prepared by melting the nickel and then adding the alloy ingredients therein with appropriate intermixture. While in a molten state the alloy may then be poured into molds for suitable ingot formation.

The generally known nickel-chromium alloys are of an 80:20 ratio. However, an alloy of this limited character does not possess the unusual properties of the present alloy which renders it so adaptable for use in dentistry. The incorporation of the four remaining elements endows the alloy of this invention with a capability of having applied thereon porcelain in a reliably bonded manner, which capacity is not demonstrated by any other non-precious alloy heretofore known. The unique composition of this alloy renders it useful in the casting of removable partial denture frames to which gold clasp wires can be soldered. Furthermore, with the alloy of this invention, individual restorative units and repairs can be accomplished by practising all currently known dental soldering techniques heretofore used with gold and silver. This unique capability is peculiar only to the alloy of this invention.

Having described my invention, what I claim and desire to obtain by Letters Patent is:

1. An alloy for dental prothesis consisting essentially of the following:

	Percentage by weight
Carbon	.03–.3
Beryllium	.3–3.5
Aluminum	.5–5
Molydenum	.4–4
Chromium	8–20
Nickel	Balance

2. An alloy for dental prothesis consisting essentially of:

	Percentage by weight, approx.
Carbon	.1
Beryllium	1.5
Aluminum	3.0
Molydenum	2.0
Chromium	12.0
Nickel	81.4

3. An alloy for dental prothesis as defined in claim 1 and further characterized by said alloy having a tensile strength of 110,000 to 115,000; a proportional limit of 55,000 p.s.i., a Brinell hardness of 276, a density of 7.8, and an elongation of 2%.

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