Oct. 23, 1951 R. E. O'MORROW 2,572,377

BIMETALLIC BACKING FOR ARTIFICIAL TEETH

Filed Dec. 6, 1949

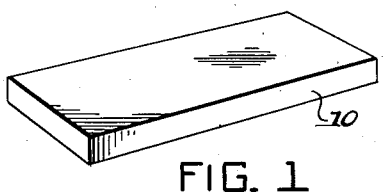


FIG. 1

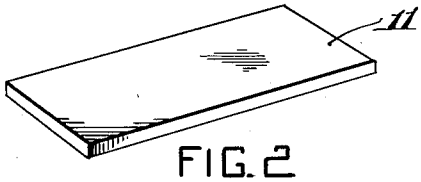


FIG. 2

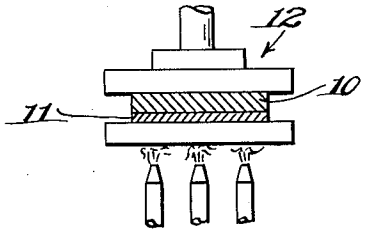


FIG. 3

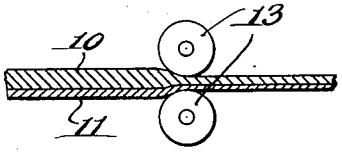


FIG. 4

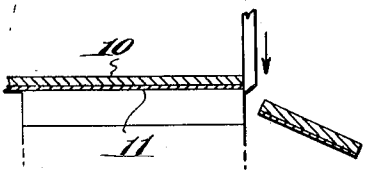


FIG. 5

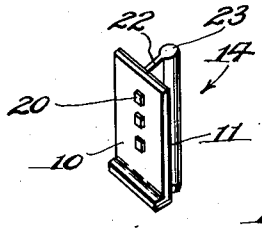


FIG. 6

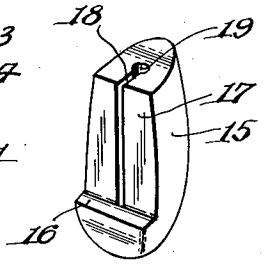


FIG. 7

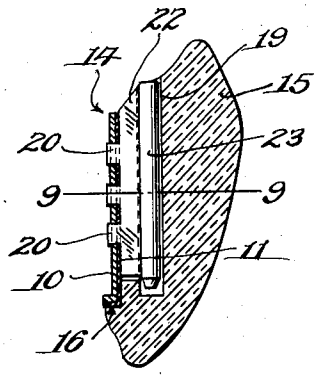


FIG. 8

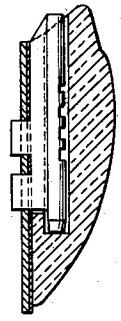


FIG. 10

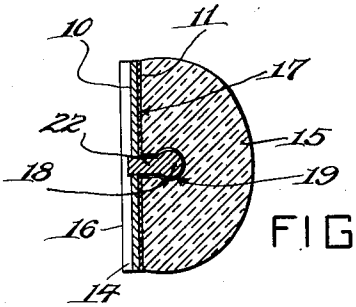


FIG. 9

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BIMETALLIC BACKING FOR ARTIFICIAL TEETH

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Application December 6, 1949, Serial No. 131,351

14 Claims. (Cl. 32—9)

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This invention relates to backings for artificial teeth and refers, more particularly, to backings used in association with interchangeable or replaceable artificial teeth or facings. Such interchangeable teeth or facings are commonly provided with mortises for receiving complementally shaped tenons provided on the backings whereby these mechanical parts co-act to form a complete tooth unit for use in dental bridgework, dentures and the like.

Heretofore the dental industry has fabricated backings containing a variety of constituent elemental metals. The precious metals, such as, gold, silver, platinum and palladium have been used in one percentage or another. Moreover, some of the non-precious metals, such as, copper, nickel and zinc, have been used in combination with one or more of the precious metals. The formulas of the constituent metals have varied in accordance with the requirements. For example, where a bridge was to be assembled by soldering an effort was made to produce an alloy for backings that would resist appreciable oxidation and which alloy would be stable in the human saliva without any deleterious effect on the human health. Likewise where a casting process was used in association with such backings, an effort was made to produce an alloy that was resistant to the deleterious gases that are liberated from dental investments commonly employed in such process, and likewise such alloys were designed to be stable during use in the human mouth.

To meet these requirements of processing and use a variety of compositions have been made and marketed heretofore. Moreover, a variety of colors have been produced in the alloys of the past, the color depending upon the constituent metals used and the quantity of each employed in the respective formula. The color of some of these alloys has enhanced the natural "life-like" appearance of the artificial teeth, whereas, the color of other alloys has detracted from the appearance.

All alloys, which serve the desired end in the dental processes, should preferably possess adequate tensile strength, suitable hardness and a melting range sufficiently high to stand up satisfactorily under the temperatures employed in the soldering and casting processes.

For sometime past, the translucency of the porcelain material used in the composition of artificial teeth has been increased. Likewise the degree of the translucency has kept pace with that of porcelain in the manufacture of plastic

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teeth, particularly those teeth made up of methyl methacrylate (acrylics). This trend toward increased translucency in artificial teeth has come about through the professional and public desire for a more "life-like" appearance. It has to do largely with the esthetic values demanded in dentures, bridgework, jacket crowns and the like.

The observation that certain colors of alloys used for backings have beneficial or deleterious effects upon the esthetic appearance of artificial teeth, and that the integrity of certain adequate physical properties ought to be maintained has lead largely to the development of the present invention. For example, backings having a more or less silver or platinum color (composed commonly of silver in the greatest percentage, gold and palladium in lesser percentages, and platinum in still lesser percentages) have proved to be encouragingly desirable in meeting the requirements for the physical properties through the dental processing and in use in the human mouth. However because of the color of such a backing, it has been observed that the esthetic values thereof are often lowered, especially when used in combination with the modern translucent artificial teeth. Such silver or platinum colored backings are apt to adversely influence the shade of the porcelain or acrylic teeth to an objectionable degree when the artificial work is placed in the human mouth.

The pleasing and satisfactory results in dental restorations are largely dependent upon the degree to which the artificial teeth of the bridge or denture match or harmonize with the colors or shades of the natural teeth. It is understood that the shades of the natural teeth are rather weak, pale or pastel in the degree of the color intensity found therein, and this obtains for each of the various colors that may be detected. Certain rather minor ranges of hues of brown, yellow, blue, red, gray and the like are found to one degree or another in the teeth of a natural dentition. The artificial teeth must match or at least harmonize with these color hues. It should be understood that extraneous factors of influence on the ultimate degree of hue or shade (which alter the shade of the artificial teeth) may come from a number of sources, for example, in the instance of interchangeable facings used in combination with backings therefor, the selection of a particular color of dental cement can be used to advantage, whereas the wrong selection may presage failure to even the untrained eye and particularly to the trained or discriminating eye. It is virtually impossible for the manufacturer to

make artificial teeth on a general commercial basis, that will match exactly the delicate hues found in the teeth of all individuals. Therefore some expedient, such as cement by virtue of its color, can often help to bring about a closer match of the artificial with the natural teeth.

Similarly the colors of metals may, and they often do, influence the hue or shade of artificial teeth. For example, the white metal alloys (having a silver or platinum color) may influence the shade of an artificial tooth, whereby, it may take on an undesirable grayish or greenish cast or greenish-blue or greenish-blue-gray cast and the like, when such a backing is used in combination with the modern translucent artificial teeth. Whereas, the use of gold colored alloys (of one intensity or another of a gold color) often times will overcome the objections and thereby be beneficial in the ultimate results of the restoration. The gold color may help enhance certain shades, such as, yellow, brown, pink etc., when such color influence is demanded. Moreover, the gold color may reduce the objectionable vividness of an undesirable blue cast, a gray cast, a greenish cast etc., and thereby bring about the ultimate color of the artificial teeth of an artificial restoration to become harmonious with the natural dentition.

It is understood in the art that backings of white metal color (per se) have been made and used heretofore, and that backings in the range of a gold color (per se) have likewise been employed. It is also understood (as explained above) that the white colored alloys have certain intrinsic advantages, especially in the desired physical properties. Moreover, the gold-colored metals have certain intrinsic advantages especially in contributing to the life-like shade harmony. The white metals generally are lacking in esthetics; the gold metals, while satisfying esthetic considerations, are lacking in the required physical properties. Gold-colored alloys, composed exclusively of precious metals, have been observed to fall short in meeting the adequate tensile strength, suitable hardness and a sufficiently high melting range. Of course, the addition of minor amounts of copper and/or nickel may increase these properties to a certain limited extent, yet such compositions become especially lacking in their resistance to the destructive gases liberated from dental investments during the procedure related to the casting process, or the resistance to oxidation may be lowered when employed in the soldering process. The white colored alloys, composed exclusively of precious metals, are perceptibly the better in meeting tests for the physical properties.

The present invention has to do with a laminated or bimetallic back, and a main object herein is to provide a single backing unit, or a plurality of such backing units, having the mechanical advantages contained in a white metal alloy coupled together with the esthetic attributes of the gold colored alloy, as complete or composite articles of manufacture.

Another object is to provide a range of constituent elemental white metals, preferably taken from the precious metal group, in such proportion as to provide a white colored alloy that will meet the needs of the art in respect to the required structural framework of a backing unit.

Another object is to provide a range of constituent elemental metals, preferably of the precious metal group, in such proportion as to produce a gold colored alloy that will meet the needs of the art in respect to the esthetic values demanded in the art.

Still another object is to provide the white and gold colored alloys in a composite bimetallic backing unit, the two laminas united together, to serve the art as a single article of manufacture and thereby take advantage of the best qualities of each of the colored alloys.

Still another object is to provide the gold colored lamina produced in a range of colors, by making use of a range of compositions, that will react beneficially, from an esthetic standpoint to improve or enhance the hues of artificial teeth for harmonious use with natural tooth hues, when used in combination with the varying degrees of the modern translucent artificial teeth or with the varying degrees of older lesser translucent artificial teeth, whether such latter teeth and former teeth are made of a porcelain material or of a plastic composition.

The composition herein found most dependable for the white metal alloy is preferably composed of metals from the precious metal group, such as, gold, silver, palladium and platinum. Moreover the gold colored alloy composition found to be most dependable is likewise composed of metals from the precious metal group, such as, gold, silver and platinum. The colors in these alloys are dependent, to an appreciable extent, on the amount of gold used in the formula, whereas, the desired physical properties are dependent, to a large degree, on the amounts of gold, silver, palladium and platinum and the proportions of each, used in making up the white colored alloy.

Heretofore, relative minor amounts of non-precious metals, such as, copper, nickel, zinc and the like, have been used in general to impart certain physical properties (increase hardness, tensile strength, flow of metal in the molten state, etc.), especially to the gold colored alloys, yet for the purpose of alloys used as backings for artificial teeth it is believed that any appreciable use of non-precious metals detracts from the desirable integrity in and during the dental processes. Appreciable amounts of these non-precious metals may unduly promote brittleness, oxidation, wear on the processing tools, lower resistance to liberated gases given off by the dental investment and the like. Of course the use of relative minor amounts of some of these non-precious metals in combination with some of the metals of some of the precious metal group can have advantages in compositions for certain specialized work and can even be fairly satisfactory for use as backings.

A. In producing the white-colored alloy portion of this invention, the constituent metals from the precious metal group, consisting of gold, silver, palladium, platinum and the like are preferred. Such an alloy composition may range in amounts of from 20% to 30% gold, from 40% to 50% silver, from 20% to 30% palladium and from .5% to 8% platinum.

B. In producing the gold-colored alloy portion of this invention, the constituent metals from the precious metal group, consisting of gold, silver and platinum and the like are preferred. Such an alloy composition may range in amounts of from 47% to 75% gold, from 18% to 45% silver and from 1% to 8% platinum.

In producing the white colored alloy, where copper and/or nickel are used, it is preferred to incorporate either or both of them at the expense of one or all of the precious metals silver, palladium and/or platinum. The preferred

amounts for copper or nickel, when used singly, may range from 1.5% to 6% in combination with the precious metals named in paragraph A above. When copper and nickel are used in combination therewith, it is preferred to employ their combined amounts within the range of from 2% to 6%. The use of copper and nickel in these amounts can increase the hardness and/or the tensile strength of the alloy but their effect may lower the resistance of the alloy to withstand the gases liberated from the dental investment in the casting process, especially, when rather high temperatures of burn out are employed or where prolonged heat soaking is required, or where a combination of both of these conditions become necessary.

In producing the gold colored alloy where copper and/or nickel are used, the preferred amounts thereof are the same as recited in the preceding paragraph and they are preferably employed with the precious metals named in paragraph B, viz., gold, silver, and platinum. In this use they should be added at the expense of the silver and/or the platinum, primarily leaving the gold in adequate amounts to give the proper color influence. Since the gold colored alloy is present in thin section in the present invention for a bimetallic backing, and accordingly since it has little to do with the framework strength, the prime object is to retain the gold color through the processing so that it will present the proper esthetic influence in the completed dental restoration. Therefore, in some instances and for some requirements the amounts of copper and/or nickel may be stepped up over the preferred amounts mentioned above and still be found satisfactory for use in combination with the artificial teeth across the varying degrees of translucency.

The following examples are given in percentages by weight of constituent elements and purely by way of illustration without in any sense restricting this invention thereto.

FOR WHITE COLORED ALLOY

Example 1

	Per cent
Gold	22
Silver	47
Palladium	27
Platinum	4

Example 2

	Per cent
Gold	26
Silver	43
Palladium	24
Platinum	7

Example 3

	Per cent
Gold	20
Silver	47
Palladium	30
Platinum	3

Example 4

	Per cent
Gold	22
Silver	40
Palladium	30
Platinum	8

Example 5

	Per cent
Gold	25
Silver	47
Palladium	27.5
Platinum	0.5

FOR GOLD COLORED ALLOY

Example 6

	Per cent
Gold	70
Silver	28
Platinum	2

Example 7

	Per cent
Gold	59
Silver	35
Platinum	6

Example 8

	Per cent
Gold	75
Silver	18
Platinum	7

Example 9

	Per cent
Gold	74
Silver	18
Platinum	8

Example 10

	Per cent
Gold	64
Silver	35
Platinum	1

Where copper and/or nickel are used, the following examples are likewise given by way of illustration and without limiting the invention thereto.

FOR WHITE COLORED ALLOY

Example 11

	Per cent
Gold	22.0
Silver	46.5
Palladium	26.5
Platinum	2.5
Copper	2.5

Example 12

	Per cent
Gold	22.0
Silver	47.0
Palladium	25.0
Platinum	2.0
Nickel	4.0

Example 13

	Per cent
Gold	22.0
Silver	47.0
Palladium	26.5
Platinum	1.5
Copper	1.5
Nickel	1.5

FOR GOLD COLORED ALLOY

Example 14

	Per cent
Gold	68.0
Silver	26.5
Platinum	1.5
Copper	4.0

Example 15

	Per cent
Gold	72.0
Silver	24.5
Platinum	1.0
Nickel	2.5

Example 16

	Per cent
Gold	69.0
Silver	25.0
Platinum	1.0
Copper	3.25
Nickel	1.75

Reference has been made under the objects recited above, to the white colored alloy as meeting the needs of the art for the "structural framework" of the completed backing unit, and likewise reference has been made to the gold-colored alloy as meeting the "esthetic" values required. By forming a backing of two layers, one layer from the white colored alloy and one layer from the gold colored alloy, the inherent advantages of each metallic composition are combined into one and the same single unit.

It has been found most satisfactory to produce a backing wherein the white alloy lamina is proportionally much thicker than the gold alloy lamina. (It should be understood that the bimetallic alloys are used to their best advantage in the flat member of the backing, or the equivalent portion of any other design of backing, because it serves no particular advantage in making up the tenon portion of the backing. In fact, the tenon is preferably made exclusively of the white metal alloy, all of which will be better understood when the drawings are later referred to herein.) In such a construction the white colored alloy performs its function in providing the

structural framework for the unit backing and more effectually retains its desired physical properties in the processing and in the use thereof. Thereby the stresses, strains, overloads and wear are taken care of by the higher tensile strength and by the hardness. Further, such a construction provides (by virtue of its greater bulk) greater resistance to the destructive gases liberated from the dental investments and the complete unit thereby retains its integrity of composition. The gold colored alloy, provides the desired esthetic effects by virtue of its position in the lamina and by virtue of its color.

In producing such a backing the process or processes commonly known to the bimetallic art may be employed, wherein, for example, an ingot of the white colored alloy of .500 of an inch thickness is placed in apposition with an ingot of the gold colored alloy of, for example, .008 of an inch thickness (the latter is much less in the proportional thickness) and the two ingots are united by heat. This is not unlike some of the welding processes where pressures of varying degrees are used in combination with heat for effecting a union of the two ingots. The welded ingot is then processed through various steps, such as, rolling and annealing until the bimetallic unit has been reduced to the desired thickness. Then strip cutting and blanking operations, and the like, may be employed in production of manufacture to obtain the required varieties and assortment of backing sizes. The assorted sizes of blanks thus obtained may be further processed whereby indicia are frequently applied by stencilling thereon certain characters, such as, trademarks, size numbers and the like. Punch presses and riveting presses are also commonly used to mechanically assemble and fasten the tenon to the flat member of the completed backing.

Where any of the non-precious metals are included in either or both of the alloy compositions it may be advantageous or necessary to use a neutral atmosphere in association with heat to effectively bring about the proper welding union between the white colored alloy composition and the gold colored alloy composition. In fact, a neutral atmosphere is often found advantageous when compositions of the precious metal groups are used and where welding thereof is desired. Nitrogen atmospheres have been found useful as well as certain controlled non-oxidizing atmosphere associated with the welding furnace. Likewise fluxes may be used to advantage under certain conditions and in association with certain alloys.

To facilitate a clear understanding of the present invention reference may now be had to the accompanying drawings, wherein:

Fig. 1 is a perspective view disclosing a block of white colored silver-predominating alloy used in forming a laminated sheet complying with the present invention;

Fig. 2 is a similar view disclosing a complemental gold-colored block which is used in association with the block in Fig. 1 to form the backing sheet comprising the present invention;

Fig. 3 is a vertical sectional view taken through the white and gold blocks when placed in superposed relationship and subjected to the action of heat and pressure to effect an inseperable union therebetween;

Fig. 4 is a detail sectional view disclosing the step of passing the block between reducing rolls for the purpose of forming a laminated sheet embodying the invention;

Fig. 5 is a view in side elevation, partly in section, disclosing the operation of transversely severing the sheet to form backings for dental facings;

Fig. 6 is a perspective view of a finished dental backing formed in accordance with the present invention;

Fig. 7 is a perspective view of a tooth facing looking toward the lingual side thereof, and illustrating the construction of the facing which is complemental to that of Fig. 6;

Fig. 8 is a vertical longitudinal sectional view taken through the facing and disclosing its operative position on an associated backing;

Fig. 9 is a transverse horizontal sectional view taken through the combined facing and backing on the plane indicated by the line 9—9 of Fig. 8.

Fig. 10 is a vertical sectional view disclosing a slightly modified form of my improved backing.

Referring to the drawings, there has been disclosed in Fig. 1 a block or slab **10** of a metal alloy which I refer to as possessing "white color" and which may be formed to embody the compositions set forth in Examples 1–5 and 11–13 herein disclosed, or reasonable variations thereof. Preferably the block or slab ingot of this white-colored alloy is formed to possess a thickness of the order of .500 of an inch, its width and length measurements vary in accordance with the demands of manufacturing equipment. The gold-colored block or ingot indicated at **11**, which may be formed to embody the compositions set forth in Examples 6–10 and 14–16, possesses a thickness of approximately .008 of an inch. When the thickness of the white-colored ingot is that above given in length and width, the two ingots are preferably of the same size.

As shown in Fig. 3, the two ingots may be placed in vertical superposed order with their side edges in relative registration and placed in a press indicated at **12**. While in the press, the two slabs or ingots are heated so that their interfaces are united. The welded ingot is then passed through various manufacturing steps, such as, as shown in Fig. 4, being passed between reducing rolls **13** until a bimetallic sheet or strip has been formed of desired thickness. Strip cutting or blanking operations, such as that disclosed in Fig. 5, may be performed on the bimetallic sheet or strip to produce blanks in sizes suitable to form backings **14** for dental facings of the interchangeable type disclosed at **15** in the drawings.

The labial side of the tooth facing is of usual form and the lingual side is provided in this instance with a shelf or shoulder **16** and a flat backing-engaging face **17**. In this face, there is provided a longitudinal slot **18** which communicates at its rear with a longitudinal post hole **19** whose diameter is greater than the width of the slot. It will also be noted that the post hole **19** is of greater length than the slot **18** and that the hole projects downwardly toward the incisal edge of the tooth for a desired distance below the bottom of the slot **18**.

To receive a tooth facing of the interchangeable type above described and illustrated in the drawings, my improved laminated backing is formed with vertically spaced openings which receive rivet extensions **20** provided on a rib **22** and a post **23**. These parts comprise the usual tenon which is received in the mortise of a tooth facing composed of the slot **18** and the hole **19**. The tenon embodying the rib **22** and the post

23 is preferably formed from the stronger alloy as represented by the white-colored metal so that the tenon will possess a high degree of mechanical strength.

It will be appreciated that the laminated or bimetallic dental backing herein set forth is applicable to artificial tooth facings which differ from the shouldered type of facing specifically illustrated in Figs. 6 to 9, inclusive, of the drawings. Thus, my improved bimetallic backing may be used in association with facings known in the art as the "flatback" type, as depicted in Fig. 10. These facings are highly translucent and have their backings extending completely to the incisal edge. It is believed that the backing of the present invention is equally effective when used in connection with this type of facing as it is when employed in connection with the shouldered type.

By this construction, a porcelain or plastic facing constructed as described may be readily positioned or removed from the composite backing, after the manner of standard interchangeable tooth construction. The specific design of the interfitting mortise and tenon parts of the backing and facing elements above described are optional and subject to considerable variation and do not form per se an essential part of the present invention, since other equivalent interchangeable backing and facing elements may be utilized within the scope of the present disclosures.

From the above description, it will be readily seen that this invention provides an article of manufacture, in the form of a laminated bimetallic backing, that meets a long-felt need in the dental art. It will also be seen that the composition of the alloys used herein will successfully meet the physical properties required in denture manufacture. Further, it will be seen that the range of composition of the constituent metals is within the practical sphere of usefulness and offers combinations therein that can be utilized in the varying phases of commonly used processes. Still further, it will be seen that the variable esthetic requirements have been met to the end that the colors and hues of teeth of natural dentition can be acceptably matched whether the artificial teeth are made of porcelain or plastic and whether the composition thereof is of a translucent or lesser translucent nature.

I claim:

1. A laminated color-modifying metallic backing for the mounting of artificial tooth facings, comprising two permanently bonded layers of alloyed noble metals, one layer having a predominantly gold coloration and being composed of said metals in substantially the following proportions stated by weight:

Gold, ranging in amounts from 47% to 75%
Silver, ranging in amounts from 18% to 45%
Platinum, ranging in amounts from 1% to 8%

the other of said layers, predominantly white in coloration, being composed of the following metals in substantially the following proportions stated by weight:

Gold, ranging in amounts from 20% to 30%
Silver, ranging in amounts from 18% to 47%
Palladium, ranging in amounts from 20% to 30%
Platinum, ranging in amounts from 5% to 8%

2. A laminated color-modifying metallic backing for the mounting of artificial tooth facings, comprising two permanently bonded layers of alloyed noble metals, one layer having a predominantly gold coloration and being composed of said metals in substantially the following proportions stated by weight:

Gold, ranging in amounts from 47% to 75%
Silver, ranging in amounts from 18% to 45%
Platinum, ranging in amounts from 1% to 8%

the other of said layers, predominantly white in coloration, being composed of the following metals in substantially the proportions stated by weight:

Gold, ranging in amounts from 20% to 30%
Silver, ranging in amounts from 18% to 47%
Palladium, ranging in amounts from 20% to 30%
Platinum, ranging in amounts from .5% to 8%

the two layers being joined and formed into a substantially flat and unitary member, and tenon means carried by said member for anchoring interchangeable tooth facings thereon.

3. A laminated color-controlling metallic backing for receiving artificial tooth facings, comprising: two permanently bonded layers of alloyed noble metals, one of said layers having a predominantly gold coloration and the other of said layers possessing a predominantly white coloration, the two layers being joined and formed into a flat member.

4. A laminated color-controlling metallic backing for receiving artificial tooth facings, comprising: two permanently bonded layers of alloyed noble metals, one of said layers having a predominantly gold coloration and the other of said layers possessing a predominantly white coloration, the two layers being joined and formed into a flat member, and tenon means formed with said member to provide a support for the mounting of a separable tooth facing on said backing.

5. A laminated color-controlling metallic backing for receiving artificial tooth facings, comprising: two permanently bonded layers of alloyed noble metals, one of said layers having a predominantly gold coloration and the other of said layers possessing a predominantly white coloration, the two layers being joined and formed into a flat member, and tenon means formed with said member to provide a support for the mounting of a separable tooth facing on said backing, said tenon means being composed of the same metals as the layer possessing white coloration.

6. A laminated color-controlling metallic backing for receiving artificial tooth facings, comprising: two permanently bonded layers of alloyed noble metals, one of said layers having a predominantly gold coloration and the other of said layers possessing a predominantly white coloration, the two layers being joined and formed into a flat member, the layer of white coloration possessing a greater thickness in the backing than the complemental layer of gold coloration.

7. A color-modified metallic backing for the support of artificial tooth facings, comprising: two permanently bonded layers of alloyed noble metals, one of said layers being composed of gold, silver and platinum and in which gold is the predominating element, thereby imparting to said first layer a substantially gold color, the other of said layers being composed of the metals gold, silver, palladium and platinum and wherein silver is the predominating element, imparting to said second layer a substantially silver or white color.

8. A color-modified metallic backing for the mounting of artificial tooth facings, comprising: two permanently united layers of alloyed noble

metals, one of said layers being composed of gold, silver, platinum and copper and in which gold is the predominating element, thereby imparting to said first layer a substantially gold color, and the other of said layers being composed of the metals gold, silver, palladium, platinum and copper in which the element silver predominates by weight, thereby imparting to said second layer a substantially white or silver color.

9. A color-modified metallic backing for the mounting of artificial tooth facings, comprising: two permanently united layers of alloyed noble metals, one of said layers being composed of gold, silver, platinum and nickel and in which gold is the predominating element, thereby imparting to said first layer a substantially gold color, and the other of said layers being composed of the metals gold, silver, palladium, platinum and nickel in which the element silver predominates by weight, thereby imparting to said second layer a substantially white or silver color.

10. A laminated color-modified metallic backing for the mounting of artificial tooth facings, comprising: two permanently united layers of alloyed noble metals, a first layer having a predominately gold coloration and being composed of said metals in substantially the following proportions given by weight:

	Per cent
Gold	70
Silver	28
Platinum	2

the second of said layers, predominately white in coloration, being composed of the following metals in substantially the proportions given by weight:

	Per cent
Gold	22
Silver	47
Palladium	27
Platinum	4

the two layers being joined and formed into a substantially flat and unitary member.

11. A laminated color-modified metallic backing for the mounting of artificial tooth facings, comprising: two permanently united layers of alloyed noble metals, a first layer having a predominately gold coloration and being composed of said metals in substantially the following proportions given by weight:

	Per cent
Gold	59
Silver	35
Platinum	6

the second of said layers, predominately white in coloration, being composed of the following metals in substantially the proportions given by weight:

	Per cent
Gold	26
Silver	43
Palladium	24
Platinum	7

the two layers being joined and formed into a substantially flat and unitary member.

12. A laminated color-modified metallic backing for the mounting of artificial tooth facings, comprising: two permanently united layers of alloyed noble metals, a first layer having a predominately gold coloration and being composed of said metals in substantially the following proportions given by weight:

	Per cent
Gold	68.0
Silver	26.5
Platinum	1.5
Copper	4.0

the second of said layers, predominately white in coloration, being composed of the following metals in substantially the proportions given by weight:

	Per cent
Gold	22.0
Silver	46.5
Palladium	26.5
Platinum	2.5
Copper	2.5

the two layers being joined and formed into a substantially flat and unitary member.

13. A laminated color-modified metallic backing for the mounting of artificial tooth facings, comprising: two permanently united layers of alloyed noble metals, a first layer having a predominately gold coloration and being composed of said metals in substantially the following proportions given by weight:

	Per cent
Gold	72.0
Silver	24.5
Platinum	1.0
Nickel	2.5

the second of said layers, predominately white in coloration, being composed of the following metals in substantially the proportions given by weight:

	Per cent
Gold	22.0
Silver	47.0
Palladium	25.0
Platinum	2.0
Nickel	4.0

the two layers being joined and formed into a substantially flat and unitary member.

14. A laminated color-modified metallic backing for the mounting of artificial tooth facings, comprising: two permanently united layers of alloyed noble metals, a first layer having a predominately gold coloration and being composed of said metals in substantially the following proportions given by weight:

	Per cent
Gold	69.0
Silver	25.0
Platinum	1.0
Copper	3.25
Nickel	1.75

the second of said layers, predominately white in coloration, being composed of the following metals in substantially the proportions given by weight:

	Per cent
Gold	22.0
Silver	47.0
Palladium	26.5
Platinum	1.5
Copper	1.5
Nickel	1.5

the two layers being joined and formed into a substantially flat and unitary member.

ROSS E. O'MORROW.

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