Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2802729 A1 2012/01/05

(21) 2 802 729

(12) DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION

(13) A1

(86) Date de dépôt PCT/PCT Filing Date: 2011/06/29
(87) Date publication PCT/PCT Publication Date: 2012/01/05
(85) Entrée phase nationale/National Entry: 2012/12/21
(86) N° demande PCT/PCT Application No.: AT 2011/000285
(87) N° publication PCT/PCT Publication No.: 2012/000006
(30) Priorité/Priority: 2010/07/02 (AT A 1124/2010)

(51) Cl.Int./Int.Cl. *A61C 5/00* (2006.01),
A61K 6/02 (2006.01)

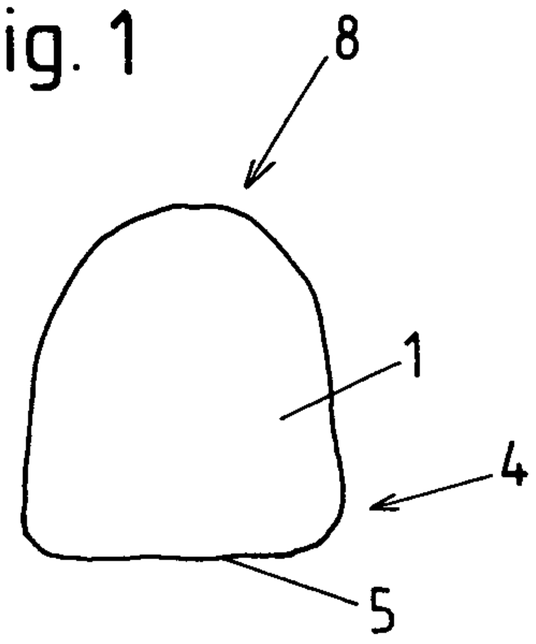
(71) Demandeur/Applicant:
LAMPL, STEPHAN, CH

(72) Inventeur/Inventor:
LAMPL, STEPHAN, CH

(74) Agent: ROBIC

(54) Titre : CORPS FACETTE DENTAIRE
(54) Title: TOOTH FRONT VENEER

Fig. 1



(57) Abrégé/Abstract:
Tooth front veneer (1), which consists of a composite material, wherein the composite material contains at least one organic binder (2), preferably with methacrylate, and preferably inorganic solid particles (3) as filler.

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

(19) Weltorganisation für geistiges Eigentum
Internationales Büro

(43) Internationales Veröffentlichungsdatum
5. Januar 2012 (05.01.2012)

PCT

(10) Internationale Veröffentlichungsnummer
WO 2012/000006 A1

(51) Internationale Patentklassifikation:
A61C 5/00 (2006.01) *A61K 6/02* (2006.01)

(21) Internationales Aktenzeichen: PCT/AT2011/000285

(22) Internationales Anmeldedatum:
29. Juni 2011 (29.06.2011)

(25) Einreichungssprache: Deutsch

(26) Veröffentlichungssprache: Deutsch

(30) Angaben zur Priorität:
A 1124/2010 2. Juli 2010 (02.07.2010) AT

(72) Erfinder; und
(71) Anmelder : **LAMPL, Stephan** [AT/CH]; Heidenerstrasse 64, CH-9450 Lüchingen (CH).

(74) Anwälte: **HOFMANN, Ralf** et al.; Egelseestrasse 65a, Postfach 61, A-6806 Feldkirch (AT).

(81) Bestimmungsstaaten *(soweit nicht anders angegeben, für jede verfügbare nationale Schutzrechtsart)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Bestimmungsstaaten *(soweit nicht anders angegeben, für jede verfügbare regionale Schutzrechtsart)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), eurasisches (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), europäisches (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

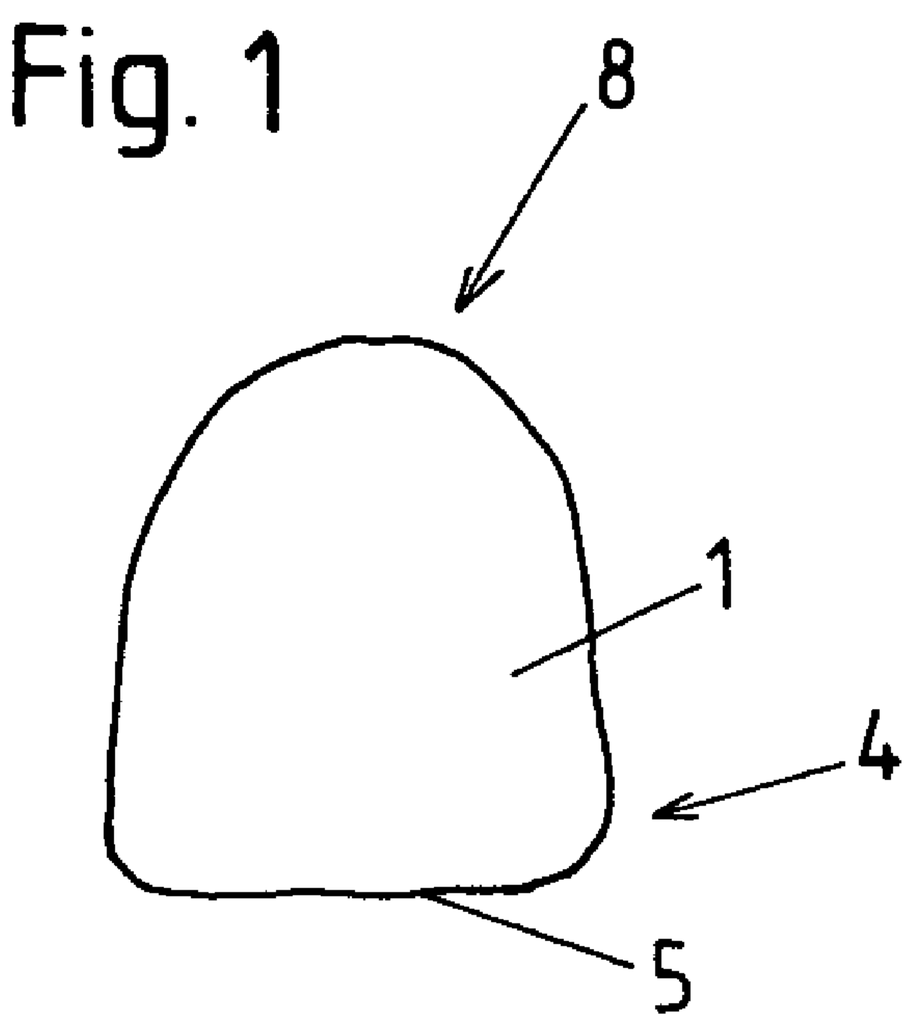
Veröffentlicht:

— *mit internationalem Recherchenbericht (Artikel 21 Absatz 3)*

— *vor Ablauf der für Änderungen der Ansprüche geltenden Frist; Veröffentlichung wird wiederholt, falls Änderungen eingehen (Regel 48 Absatz 2 Buchstabe h)*

(54) **Title**: TOOTH FRONT VENEER

(54) **Bezeichnung** : ZAHNFRONTVERBLENDUNGSKÖRPER



(57) **Abstract**: Tooth front veneer (1), which consists of a composite material, wherein the composite material contains at least one organic binder (2), preferably with methacrylate, and preferably inorganic solid particles (3) as filler.

(57) **Zusammenfassung**: Zahnfrontverblendungskörper (1), welcher aus einem zusammengesetztem Material besteht, wobei das zusammengesetzte Material zumindest ein organisches Bindemittel (2), vorzugsweise mit Methacrylat, und, vorzugsweise anorganische, Feststoffpartikel (3) als Füllstoff enthält.

WO 2012/000006 A1

Tooth Front Veneer

The present invention relates to a tooth front veneer.

Tooth front veneers are known in the prior art. They are frequently also called veneers. They usually represent shell-shaped solid bodies, which are placed as veneering on perhaps previously ground teeth and/or tooth stumps, in order to provide the discolored tooth with the desired look. They generally replace the natural front surface of the respective tooth.

In the prior art, these tooth front veneers are made from ceramics. For this purpose, the required geometry of the tooth front veneer is determined first, for example, by means of an impression of the ground tooth and/or tooth stump. Based on this information, the ceramic tooth front veneer is then produced in the laboratory. In a third step, the dentist must then mount this tooth front veneer at the tooth or the tooth stump. If the tooth front veneer was not produced with sufficient care, a new tooth front veneer had to be produced, because an on-site adjustment to the conditions in the mouth of the patient by the dentist is not possible. This ultimately means that the patient must go to the dentist at least twice, until a tooth front veneer, which fits, is produced and mounted at the tooth. Moreover, the need for laboratory work implies a considerable expenditure of time and money.

It is an object of the invention to make available a tooth front veneer, which can be adjusted in size during a single visit to the dentist and can be mounted at the defective tooth or tooth stump.

Pursuant to the invention, this is attained in that a tooth front veneer consists of a composite material, the composite material containing at least one organic binder, preferably with methacrylate, and, preferably inorganic, solid particles as fillers.

An essential, basic concept of the invention therefore consists of producing the tooth front veneer of a composite or composite material instead of ceramic

materials, the composite material containing at least an organic binder and the above-mentioned solid particles as filler. Advantageous embodiments provide that an exterior surface of the tooth front veneer is laser-treated at least regionally and forms a continuous cured respectively vitrified enamel layer. The composite material, of which the tooth front veneer consists, may regionally, above all at the surface of the tooth front veneer, also have a layer, which consists essentially of the fused material of the solid particles. The shape of tooth front veneers of this type can be processed on site by the dentist using the tools, customary in any dental practice, and thus be adjusted to the conditions existing in the patient. It is therefore no longer necessary to have the tooth front veneers produced in the laboratory. As in the prior art, the inventive tooth front veneers are solid bodies, which can be placed, to begin with, on a tooth stump or tooth, prepared as in the prior art, in order to veneer the front surface of a discolored tooth appropriately and improve it visually. Primarily because of the solid particles used as fillers, the inventive tooth front veneers, however, also shows the required strength and hardness, so that the tooth, provided with the tooth front veneer, can perform its actual objective as a chewing tool permanently.

In this context it is particularly advantageous if the solid particles of the filler contain glass, particularly a mixture of several different types of glasses, or consist thereof. The types of glass may differ in their coloration as well as in their composition. For example, it is conceivable to use barium glasses or strontium glasses or mixtures thereof. In general, they may be surface-treated SiO_2. In order to achieve a tooth front veneer of high strength, it is advantageous to dispose the solid particles of the filler packed as densely as possible in the tooth front veneer. For this purpose, it is advantageous if the filler contains solid particles of different grain sizes. Generally speaking, in the preferred embodiments, the grain sizes of the solid particles of the filler range from 0.01 µm to 50 µm. However, in order to achieve as high a packing density as possible, particularly the small grain sizes are also important, because they fill the spaces between the larger grains. In this sense, it is advantageous if the filler contains solid particles with grain sizes ranging from 0.01 µm to 3 µm. In the sense of strength, the aim should be to achieve the highest possible degree of filling of the composite material of the tooth front veneer. The proportion of solid particles

in the filler in the composite should be as high as possible. In this context, the proportion of solid particles of the filler in advantageous variations of the invention is at least 75% by volume, preferably at least 82% by volume, of the composite material of the tooth front veneer.

Preferred embodiments of the invention use binders based on methacrylate as the organic binder. These may consist of methacrylate or include methacrylate, preferably as the primary component.

Tooth front veneers advantageously are solid bodies, which preferably are curved shell-shaped at least regionally.

An important task when attaching tooth front veneers to teeth or tooth stumps is to develop the coloration of the tooth, veneered with the tooth front veneer, so that it matches the conditions in the mouth of the patient, that is, also the adjacent teeth. Preferred embodiments of the invention provide that the tooth front veneer has a standard color, which comes close to the color of natural tooth enamel. It is particularly preferred in this sense that the tooth front veneer is translucent or transparent and is not opaque. One idea is to adjust the color by using an appropriately colored fastening material, which is disposed between the tooth front veneer and the tooth or tooth stump when the tooth front veneer is mounted and shines through the translucent tooth front veneer and in this way determines the color of the overall structure perceivable towards the outside. Investigations have shown that the tooth front veneer most advantageously has a translucency of 28% to 39% or an L value of 59 to 69 and/or an "a" value of -0.35 to -3.2 and/or a "b" value of -0.4 to -6.95. Translucency relates to light permeability and is therefore the inverse of opacity. The values mentioned relate to a DIN measurement 6174. The lab color space is also known in the prior art. It is designed on the basis of the complementary color theory and permits colorimetric values and color distances to be determined in an approximated uniform CIELAB color space. The L value, the "a" value and the "b" value are also determined according to DIN 6174. Applying the complementary color theory, the green and are red opposite to one another here on the a-axis. The b-axis corresponds to the complementary colors blue and yellow. The L axis is perpendicular to this plane and indicates the brightness.

Because of their high strength, the tooth front veneers may be constructed relatively thin. It is particularly preferred if the tooth front veneer has a cutting edge at one of its end regions, preferably with a thickness of 1.0 mm to 1.3 mm, it being particularly preferred if the tooth front veneer, aside from the end region with the cutting edge, has a maximum thickness of 0.6 mm and/or runs out flat at its end opposite to the cutting edge. In each case, the thickness is to be understood as the wall thickness in the appropriate region of the tooth front veneer.

As stated, the inventive tooth front veneer makes it possible for the dentist to fit a tooth front veneer or an appropriate blank on site to match the geometric requirements of the tooth or the stump of the patient. If the dentist additionally has the possibility of selecting a corresponding fastening material according to its color, the desired matching of color can also be carried out on site additionally. In order to make available to the dentist all the tools required for the treatment in addition to the normal equipment, a particular aspect of the invention provides a set of several, inventive tooth front veneers, especially in different sizes and/or shapes, the set additionally having at least one, preferably liquid or pasty fastening material and several different colors for coloring the fastening material and/or several differently colored, preferably liquid or pasty fastening materials, the fastening material or materials being suitable, preferably, for gluing the tooth front veneer to a tooth or stump. This enables the dentist to select, from the set of tooth front veneers made available to him, the size, which comes closest to the natural situation at the tooth or stump, which is to be treated. The remaining matching can then be performed by processing or grinding this blank on site. For this purpose, the dentist may resort to the standard grinding tools available to him. Furthermore, the dentist may select the suitable color or the appropriately colored fastening material, with which the tooth front veneer is to be fastened, preferably glued, to the tooth, so that the desired coloration of the tooth front veneer, fastened to the tooth or the stump, is achieved. In order, finally, to make differently colored fastening materials available, the set, in one embodiment, may include at least one fastening material and several different colors, with which the fastening material is colored by the dentist. Preferably, however, the set has already several differently colored fastening materials, for which the color no longer that has to be mixed into the fastening material by the dentist. The fastening material may be pasty, mushy or viscous. In order to be able to process smaller fissures, it is, however, also conceivable to make liquid fastening materials available in the set. In particularly preferred embodiments of an inventive set, the fastening material, preferably present in the form of a paste, is a material of the same

composition as the tooth front veneer, however, still in a pasty consistency. Furthermore, it is advantageous if the fastening material, which is present particularly in the liquid form, contains the same organic binder as the tooth front veneer of the set, however, still in a liquid form.

Moreover, preferred embodiments of the inventive set see to it that the set contains at least one adhesion promoter, preferably at least two different adhesion promotors, and/or at least one etching agent. An adhesion promoter or the bonding serve to produce the bond between the hydrophilic tooth and the hydrophobic, composite material of the tooth front veneer or the fastening material. In this connection, the adhesion promoter should also absorb the shrinkage forces of the fastening material. It is advantageous to make at least two different adhesion promoters available in the set. One of these can be used as adhesion promoter between the tooth or stump and the fastening material and the other as adhesion promoter between the fastening material and the tooth front veneer. For example, the products referred to as REF 2050 and REF 2051 of Indigo-dental GmbH & C0. KG, in Pinneberg, Germany, are suitable as adhesion promoters. The REF 2050 product may be used, for example, as an adhesion promoter between the tooth stump and the fastening material. It contains methacrylated polyacrylic acid in a bis-GMA-based matrix. The REF 2051 product may be used, for example, as an adhesion promoter between the fastening material and the tooth front veneer. It is also a bis-GMA-based methacrylate.

The etching material, for example, in the form of an etching gel, serves to etch away the lubricant layer, caused by the drill of the dentist, and to expose the tubuli. Suitable edging materials are, for for example, 15 – 37% phosphoric acid or the REF 2052 product of the company, which has already been mentioned above. The use of previously prepared mixtures of etching materials and adhesion promoters is also conceivable. Generally, the adhesion promoters are low molecular weight methacrylates. Monomers, which have a hydrophilic and a hydrophobic end, such as methacrylated polyacrylic acid, may also be used.

However, as composite materials for the preparation of tooth front veneers and also as fastening material, the product of Indigodental GmbH & Co. KG, in Pinneberg, Germany, known under the name of REF 2061, may also be used. This product contains triethylene glycol dimethacrylate, urethane dimethacrylate, bis-GMA and ethoxylated bisphenol A dimethacrylate. As organic binder, the REF 2050 product

of this company, which has already been named in connection with the adhesion promoter, may, for example, be used. As dyes, especially for coloring the fastening materials, organic pigments and/or the inorganic whitener TiO2 may be used.

Further details and features of preferred embodiments arise out of the following description of the Figures, in which

Figures 1 to 3 show different inventive tooth front veneers for teeth of the upper jaw in a frontal view;
Figures 4 to 6 show longitudinal sections through the tooth front veneers of Figures 1 to 3, disposed in each case on said teeth,
Figures 7 to 9 show different inventive tooth frnt veneers for teeth of the lower jaw,
Figures 10 to 12 show longitudinal sections through the tooth front veneers of Figures 7 to 9,
Figure 13 shows a diagrammatic exploded representation for mounting the tooth front veneer on a tooth stump,
Figure 14 shows a diagrammatic side view of the tooth front veneer mounted on the tooth stump,
Figure 15 shows a diagrammatic photomicrograph of the composition material of the tooth front veneer and
Figure 16 shows an inventive embodiment of a set.

Figures 1 to 3 show different tooth front veneers 1 for different teeth of the upper jaw. Figures 7 to 9 show different tooth front veneers 1 for different teeth of the lower jaw. Investigations have shown that it is possible to generalize the tooth shapes occurring in different patients in such a way, that almost all naturally occurring tooth shapes can be covered with relatively few, different pre-shaped blanks 1, if the dentist selects the correct blank of tooth front veneer 1 on-site and adapts it to the actual shape of the tooth of the patient. In contrast to the prior art, this is possible in the case of the inventive tooth front veneers 1. It is possible therefore to make do with a relatively small number of sets of blanks. These can be offered, for example, in three different size steps for the upper jaw and two different size steps for the lower jaw. Figures 4 to 6 and 10 to 12 each show a longitudinal section through the tooth front veneer 1 of the Figure disposed above it. Each of the tooth front veneers 1 shown has an end region 4 in the area of the cutting edge 5.

While chewing, the cutting edge 5 comes directly into contact with the food to be chewed, in order to comminute it. As can be seen particularly in the longitudinal sections of Figures 4 to 6 and 10 to 12, the tooth front veneer 1 has its greatest thickness 6 in the end region 4 of the cutting edge 5. Advantageously, the thickness 6 is between 1 mm and 1.3 mm. In the end region 4, the tooth front veneers 1 shown, as seen in the longitudinal section, are constructed hook-shaped or step-shaped at least on the back, so that, when the tooth front veneer 1 is mounted on the tooth stump 10, the cutting edge 5 forms the whole cutting edge of the tooth so restored. As can be seen in Figure 14, the tooth stump 10 is then in positive contact with the free end 18 of the end region 4, which is formed hook-shaped or step-shaped, when viewed in the longitudinal section. Outside of the end region 4, the thickness 7 of the tooth front veneer 1 is significantly less and, advantageously, reaches a maximum of 0.6 mm. At the end 8 opposite the cutting edge 5, the embodiments of tooth front veneers 1 shown run out flat. On the whole, the shape of the tooth front veneer 1 is curved and shell-shaped regionally.

Figure 13 shows a roughly diagrammatic tooth stump 10, which has already been fully prepared and etched. To begin with, a first adhesion promoter 12 is applied on this, an an intimate connection being produced between the tooth stump 10 and the fastening material 9a, b or c. Advantageously, the fastening material is a pasty material. Advantageously, the fastening material is made from the same composite material, that is, the organic binder 2 as well as the solid particles 3, from which the tooth front veneer 1 is also produced. However, it still has a pasty consistency. In addition, the fastening material is also colored in order, in interaction with the translucency of the tooth front veneer, to produce the desired coloration in the finished state, when attached to the tooth. For attachment over a large area, the fastening material 9b and 9c contains an organic binder 2 as well as solid particles 3. However, this material is relatively mushy or pasty. In order to be able to process the regions with a very delicate surface structure, this fastening material 9b and 9c may also be replaced by a fastening material 9a, which, aside from the coloration, exclusively contains organic binder 2 or at least a lesser amount of solid particles 3 of, for example, 60 to 70% by volume as filler. This fastening material 9a may contain the same organic binder, preferably one based on methacrylate and also the same type and mixture of solid particles as the composite material of the finished tooth front veneer 1, but in a lesser concentration. Advantageously, once again an adhesion promotor is applied between the fastening material 9a, b or c and the tooth front veneer 1. It is particularly preferred if this is an adhesion promotor 11 other

than the adhesion promotor 12. Suitable examples of adhesion promotors were given above.

Figure 14 shows the finished state, in which the tooth front veneer 1 is fstened by means of the fastening material 9a, b or c to the tooth stump 10, the adhesion promoters 11 and 12 being interposed. The coloring pigments, present in the fastening material 9a, b or c, shine through the translucent material of the tooth front veneer 1 and thus give the desired coloration, much as in the case of a natural tooth.

Figure 15 is a diagrammatic enlargement of the composite material of the tooth front veneer 1. The different solid particles 3 are intimately connected to one another by means of the organic binder 2. Preferably, a methacrylate-based resin is used as organic binder. A concrete The solid particles 3 preferably consist of a mixture of glasses with solid particles 3 of different grain sizes. By these means, a very tight packing and, with that, a high stability and abrasion resistance of the composite material is achieved. Advantageously, the proportion by volume of solid particles 3 in the tooth front veneer 1 is at least 75% and preferably at least 82% of the composite material. In order to be able to fill also the gaps between the relatively large grains as completely as possible, particularly preferred embodiments of the invention ensure that the particle sizes of at least a portion of the solid particles 3 lie between 0.01 µm and 3 µm.

Figure 16 diagrammatically shows a set of several inventive tooth front veneers 1 in different sizes and various other tools for a neighboring the dentist to match and mount the tooth front veneer 1 at the tooth stump 10 with in a single appointment.

The set of Figure 16 shows different sets of tooth front veneers 1 in different sizes and shapes. In the example shown, there is a set of tooth front veneers 1 for the teeth of the upper jaw in three different sizes. For the lower jaw, two different sizes are provided in the set shown. The tooth front veneers 1 are constructed in different basic shapes. The size difference between the small, medium and large preferably is 10% in each case. From this offering of tooth front veneers 1, the dentist can select the one which is the best fit for the tooth of the patient and then make the fine adjustment plan by means of appropriate grinding on site. In order to make it easier for the dentist to select the correct tooth front veneer 1, the set of Figure 16

has different templates 15, with which the optimally pre-shaped tooth front veneer 1 can be selected easily. Aside from the tooth front veneers 1, the set of Figure 16 also has different fasting materials 9a, b and c. 9a comprises differently colored organic binders 2, filled into different syringes, optionally with a small proportion of solid particles 3, preferably in the concentration given above. The fastening material 9a is used, when it is necessary to fill very small cavities with fastening material. Aside from colored pigments and optionally further additives, the fastening material 9a may correspond essentially to the organic binder 2, which contains the composite material of the tooth front veneer 1 of this set, optionally in addition to the aforementioned small amount of solid particles 3. The fastening materials 9b and 9c are differently colored, pasty fastening materials. Advantageously, these contain the composite material of the tooth front veneer 1 in a not yet cured consistency. The fastening materials 9b and 9c accordingly comprise the organic binder 2 as well as the solid particles 3. With the help of the color key 14, the dentist can select the suitably colored fastening material 9a, b and c and use it in the manner indicated in Figure 13 for fastening the tooth front veneer 1 to the tooth stump 10. In the example shown, the different fastening materials 9c are provided in the event that natural enamel is still present at the tooth stump 10. The colors selected here are therefore very bright. The different fastening materials 9b are provided in the event that the enamel has been removed completely from the tooth stump 10 and that it is necessary to work with stronger colors, so that the desired result is attained. In the example shown, the set of Figure 16 comprises also application needles 16, with which the fastening material 9a, b and/or c may be applied on the tooth stump 10. 11 and 12 are two different adhesion promoters, which can be used, as shown diagrammatically in Figure 13. Furthermore, the set of Figure 16 shows an etching material 13 for etching away the smear layer, caused by the previous processing of the tooth stump 10, before the respective adhesion promoter 11 of 12 is applied, and for exposing the tubuli or tooth stumps or teeth. In addition, a material 17 is also provided in the example shown, which is a combination of an etching material and an adhesion promoter. Preferred embodiments of appropriate sets are offered in appropriate containers. The division of the compartments and the contents in Figure 16 are of course shown only by way of example and are diagrammatic.

One method of producing inventive tooth front veneers 1 from the composite material, which is mentioned above and is, for example, commercially available, may comprise the following steps:

To begin with, the composite material or composite, comprising the organic binder 2 and the solid particles 3, is filled under vacuum into cartridges, heated to about 60°C and injected into the tooth molds, which are appropriately transparent on one side, at a pressure of 8 to 100 bar. The tooth molds may be produced from glass and chromium steel. The composite material may then be cured with a suitable LED light and an exposure time of, for example, 60 seconds. A suitable LED light is characterized, for example, by wavelength of 450 nanometers (nm) to 480 nm. After that, the tooth front veneers 1 can be heated, for example, to 100°C in a vacuum-pressure oven for a period of, for example, 10 minutes. and tempered. Subsequently, the blanks of the tooth front veneers 1 are removed from the molds. Particularly advantageous variations then provide laser light processing at the facial surface of the tooth front veneer 1. Subsequently, the shape is cut to size and finished. During the laser processing of the facial surfaces, the organic binder 2 at the surface of the tooth front veneer 1 is inhibited or removed and a high gloss surface, which forms a completely cured and vitrified melt layer as a surface of the tooth front veneer 1, is formed practically exclusively on the solid particles 3. This cured or vitrified melt layer is verifiable in a sections through the tooth front veneer 1 and has a thickness preferably of between 10 and 20 µm.

Alternatively to the method described, it is also possible to laser the tooth front veneer 1 from a block of the composite material, the cured or vitrified med layer being formed automatically as a surface of the tooth front veneer 1.

Legend

for the reference numbers:

1 tooth front veneer

2 binder

3 solid particles

4 end region

5 cutting edge

6 thickness

7 thickness

8 end

9a, b, c fastening material

10 tooth stump

11 adhesion promoter

12 adhesion promoter

13 etching material

14 color key

15 templates

16 application needle

17 etching material and adhesion promoter

18 free end

Claims

1. A tooth front veneer (1), characterized in that it consists of a composite material, the composite material containing at least one organic binder (2), preferably with methacrylate, and preferably inorganic solid particles (3) as filler.
2. The tooth front veneer (1) of claim 1, characterized in that it is curved shell-shaped at least regionally.
3. The tooth front veneer (1) of claims 1 or 2, characterized in that the solid particles (3) of the filler contain or consist of glass, preferably a mixture of different types of glasses, and/or that the filler contains solid particles (3) of different grain sizes, especially of grain sizes between 0.01 µm and 3 µm.
4. The tooth front veneer (1) of one of the claims 1 to 3, characterized in that an outer surface of the tooth front veneer (1) is laser treated at least regionally and forms a continuous cured respectively vitrified melt layer.
5. The tooth front veneer (1) of one of the claims 1 to 4, characterized in that the solid particles (3) of the filler constitute a proportion of at least 75% by volume, preferably of at least 82% by volume, of the composite material of the tooth front veneer (1).
6. The tooth front veneer (1) of one of the claims 1 to 5, characterized in that it is translucent, preferably has a translucency of 28% to 39% and/or has an L value of 59 to 69 and/or has an "a" value of -0.35 to -3.2 and/or has a "b" value of -0.4 to -6.95.
7. The tooth front veneer (1) of one of the claims 1 to 6, characterized in that, at one of its end regions (4), it has a cutting edge (5), preferably 1 mm to 1.3 mm thick (6), the tooth front veneer (1), outside of the end region (4) with the cutting edge (5), preferably having a maximum thickness (7) of 0.6 mm and/or running out flat at its and (8) opposite to the cutting edge.
8. A set with several, preferably differently sized and/or differently, shaped tooth front veneers (1) of one of the claims 1 to 7, the set additionally having at least one, preferably liquid or pasty, fastening material (9a, 9b, 9c) and several different colors for coloring the fastening material (9a, 9b, 9c) and/or several differently colored, preferably liquid or pasty fastening materials (9a, 9b, 9c), the fastening material (9a, 9b, 9c) respectively the fastening materials (9a, 9b, 9c)

being suitable for fastening, preferably for gluing the tooth front veneer (1) to a tooth stump (10)

9. The set of claim 8, characterized in that the fastening material (9) contains the same composite material or the same organic binder as the tooth front veneer (1).
10. The set of claims 8 or 9, characterized in that the set contains at least one adhesion promoter (11,12), preferably at least two different adhesion promoters (11,12) and/or at least one etching material (13).

Fig. 1

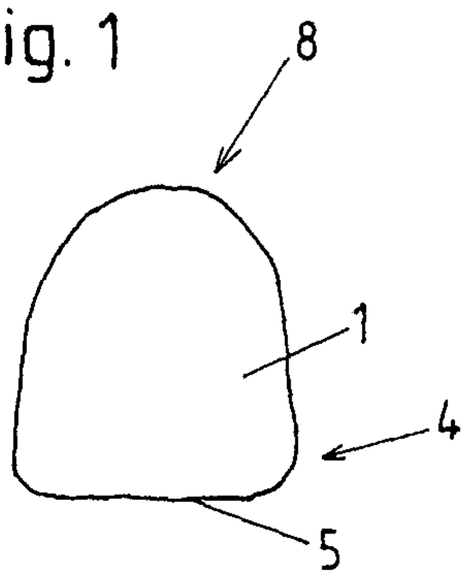


Fig. 2

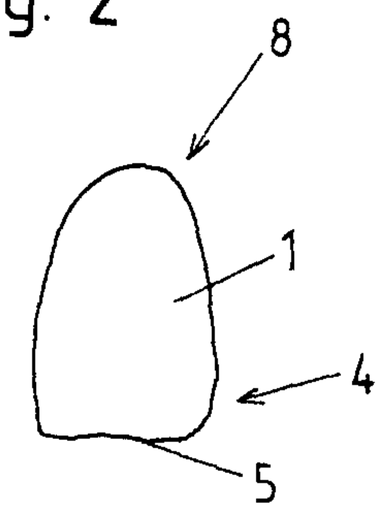


Fig. 3

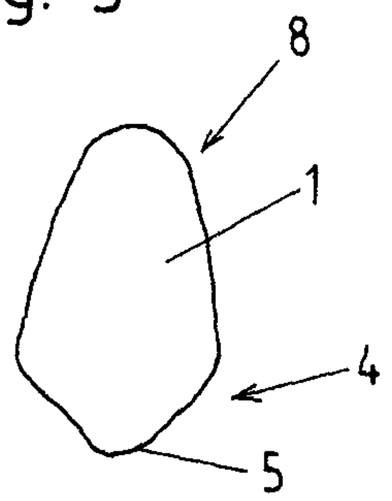


Fig 4

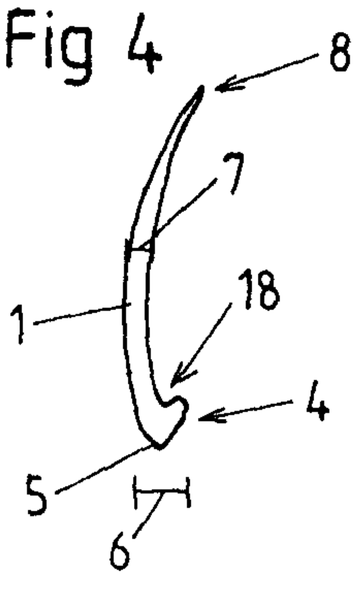


Fig. 5

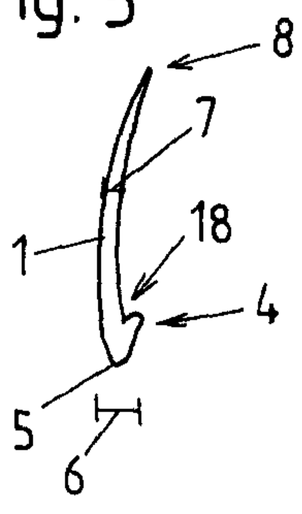


Fig. 6

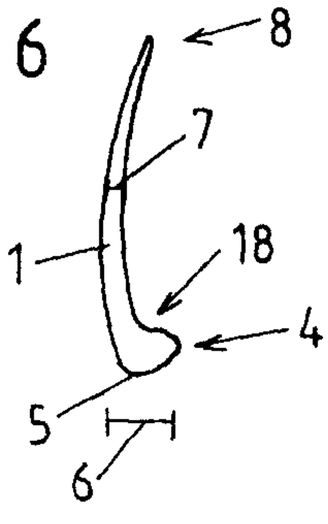


Fig. 7

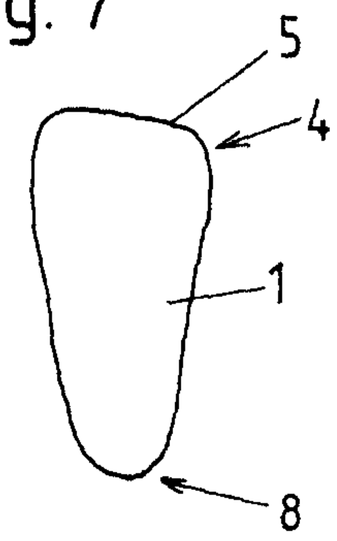


Fig. 8

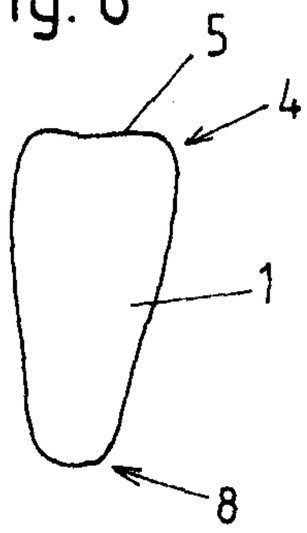


Fig. 9

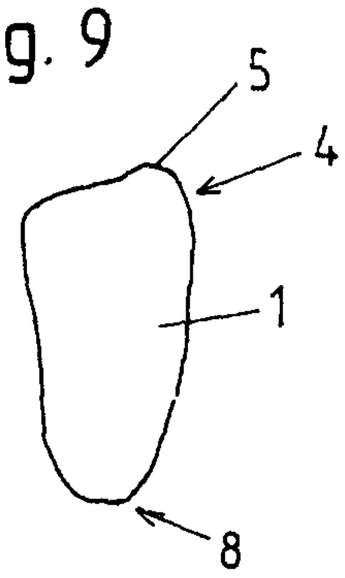


Fig. 10

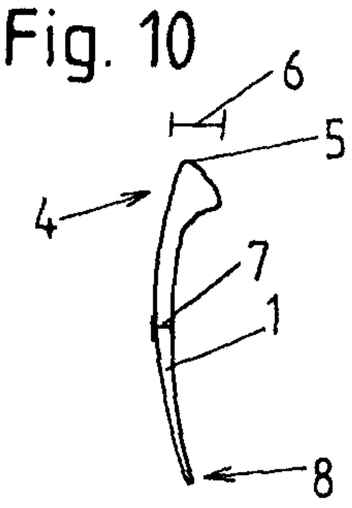


Fig. 11

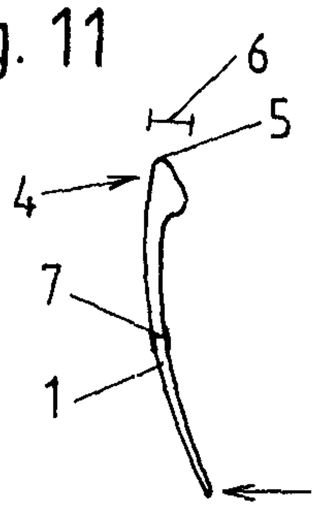


Fig. 12

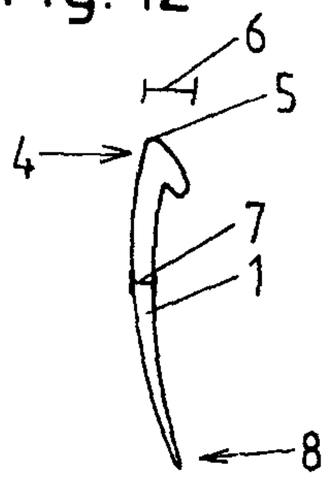


Fig. 13

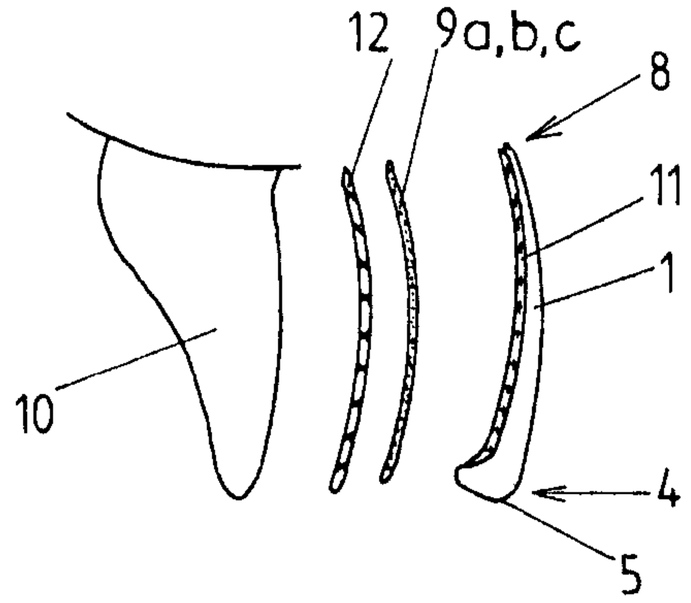


Fig. 14

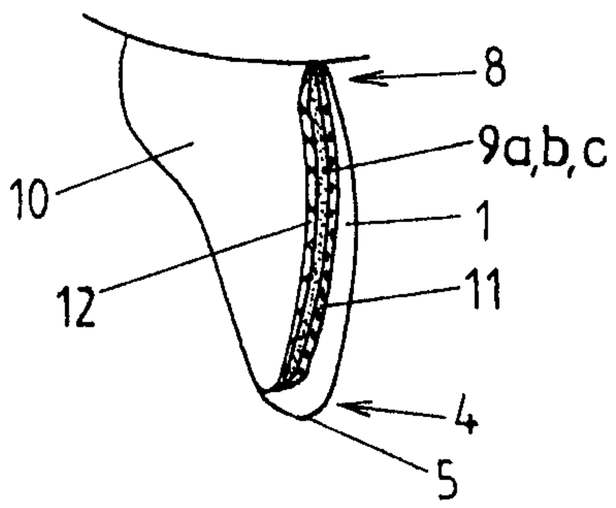


Fig. 15

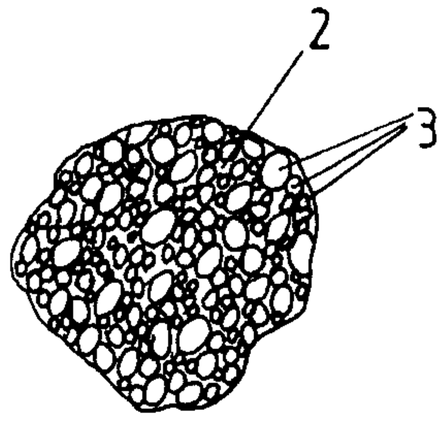
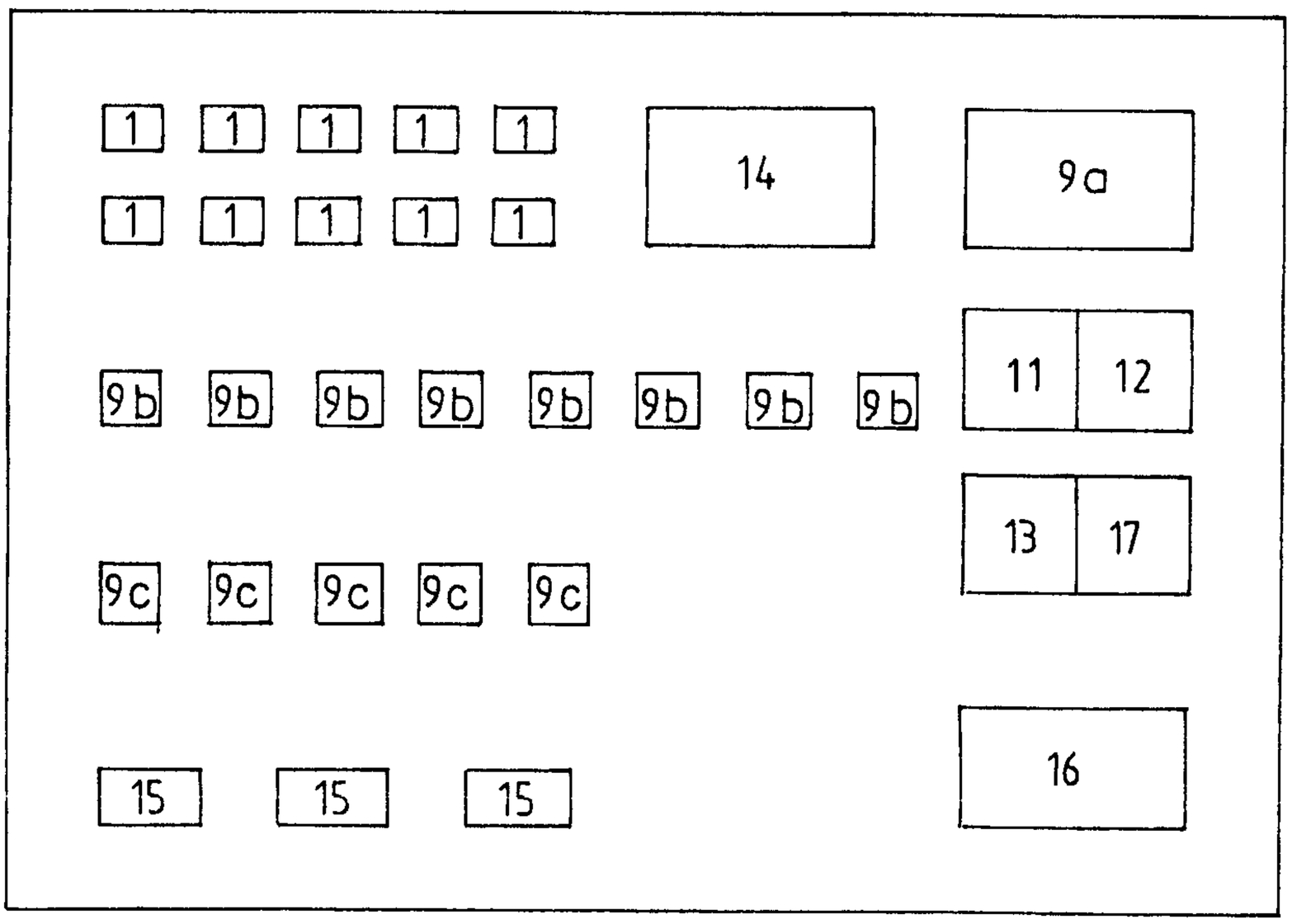


Fig. 16



24107

Fig. 1

