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C. HILTEBRANDT

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DENTAL BRIDGE

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Fig. 2

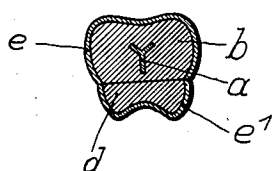


Fig. 1

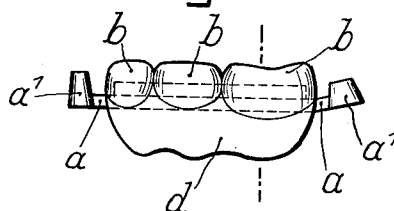


Fig. 4

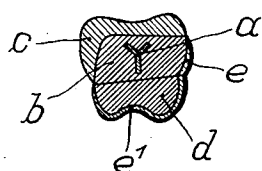
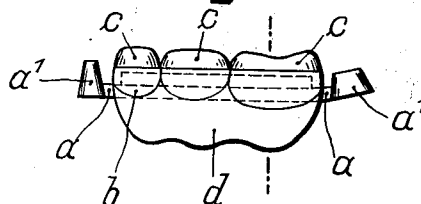


Fig. 3



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DENTAL BRIDGE

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11 Claims. (Cl. 32—5)

The invention relates to a method for the manufacture of a porcelain dental bridge with a reinforcing framework i. e., a dental bridge in which no metal is visible.

Hitherto the intermediate elements have been produced on the metal reinforcement of the porcelain bridge in that the intermediate elements, i. e., the teeth arranged between the clips at the ends of the bridge, are modelled individually side by side in the porcelain material. The method is very tedious in that the material for the teeth must be applied and fired in layers for each tooth separately and in the completed bridge the individual elements are disposed side by side without being interconnected or at the most there is only a weak interconnection. With this known method it is not possible to join the teeth together to a large extent by firing or even to replace gum portions because the shrinkage of the porcelain materials hitherto customary for this purpose is so considerable that cracks occur.

In the case of gold bridges it has already been proposed to provide on the front side of the bridge, or on the front side and on the gum side, a previously shaped and fired porcelain facing, by securing the facing to the bridge by means of a ceramic material of lower melting point than the facing. In this case all that is involved is a partial covering of the ordinary gold bridge in which the biting surface and the inner surface adjacent the tongue are exposed.

In contradistinction thereto according to the present invention in the production of a porcelain bridge, i. e., a bridge which has no exposed metal parts, a bridge of wax corresponding to the bridge which is to be produced is modelled about a metal framework provided with the two clips. Any gum portions which are to be replaced can be modelled at the same time. However prior to the modelling of the intermediate elements in wax, the supporting framework including the clips can be coated with a thin layer of non-shrinking porcelain and fired and the intermediate elements are modelled in wax about this coating. This affords the advantage that the separate preparation of sheaths which have to be cemented on to the clips is dispensed with. Also a precise match of colour can be obtained between the coating of the clips and the intermediate elements.

In either case a mould is made from the wax block with the supporting framework whereupon the wax is run out and the cavity thus produced

filled with a non-shrinking porcelain material which is then fired.

The non-shrinking porcelain material employed in the present case must have the property of forming a firm connection with the metallic framework, without giving rise to stresses and consequent cracks. Suitable non-shrinking porcelain material are those which contain refractory components primarily quartz and clay as well as melting fluxes so that by firing the material does not fuse but nevertheless forms an intimate connection with the metallic framework.

The metal employed for the reinforcing framework and for the clips must be a metal or a metal alloy which neither oxidizes or gives off gas during firing. Platinum iridium alloy is particularly suitable.

After the porcelain bridge has been fired, a layer of glaze is applied to the porcelain on all sides and fired. This layer of glaze is a thin layer of transparent ceramic material of low melting point and coloured to correspond with the natural teeth.

Instead of modelling the intermediate elements by means of a mould they can, if desired, be directly modelled on the supporting framework by hand which of course necessitates somewhat greater dexterity.

On the other hand for facilitating the modelling work the porcelain bridge can be equipped on its front side as well as on the biting surface with a separately produced porcelain facing. In this case previously prepared artificial teeth which are subsequently ground as required are employed as the facing and these teeth set in the requisite position are connected by means of wax to the metal framework which may be already coated with a thin layer of porcelain if desired. Thereupon the remainder of the body of the bridge is completely modelled in wax in accordance with the final form which the bridge is to have, a mould produced from the model and after extruding the wax the cavity is filled with a non-shrinking porcelain material which is then fired, the porcelain material forming an intimate connection on the one hand with the metal framework or the porcelain coating thereon and on the other hand with the porcelain facings. The sections of the porcelain bridge which are not covered by the tooth facings are then provided with a transparent coloured layer of glaze as in the previous case.

The advantages of the present method are as follows:

The intermediate elements of the bridge or the intermediate elements and the coating on the clips constitute a unitary block of porcelain with no exposed metal. Due to the unitary nature of the porcelain block the latter has a high rigidity and in contradistinction to known methods a far-reaching degree of freedom is afforded in respect of the shaping of the intermediate elements it even being possible to replace portions of the gum. Moreover the manufacturing process is materially simplified, facilitated and accelerated.

In the accompanying drawing:

Fig. 1 shows one embodiment of a porcelain bridge produced in accordance with the invention in side view.

Fig. 2 is a cross section thereto.

Figs. 3 and 4 show a second embodiment of the invention in side view and in cross section.

The metal framework *a* which consists of a metallic material such as platinum iridium alloy for example which does not oxidize and also does not give off any gas is provided with the usual clips *a'*.

The intermediate elements *b* of correspondingly coloured non-shrinking porcelain are fired on to this metallic framework, the porcelain material comprising refractory components as well as a melting flux to such an extent that by firing the material does not fuse but nevertheless forms an intimate connection with the metallic framework.

In the embodiment shown in Figs. 1 and 2 the porcelain material *b* is coated on all sides with a layer of glaze *e* coloured to correspond with the natural teeth.

In the embodiment shown in Figs. 3 and 4 the porcelain material *b* is provided on the front side and on the biting surface with correspondingly ground artificial teeth *c* and is fired to form a unitary block therewith and those surfaces which are not covered by the artificial teeth *c* are coated with an appropriately coloured layer of glaze *e*.

In both cases and as indicated in the drawing the porcelain block *b* may include replacement gum portions *d* which consist of the same porcelain material as the portion *b* and are coated with a layer of glaze *e'* which is coloured to correspond with the natural gum.

What I claim is:

1. A method of producing a dental bridge comprising modeling a block of non-shrinking porcelain material about a reinforcing frame so as to form at least one tooth, firing said block and coating the same on all sides with a layer of transparent ceramic material having a color corresponding to that of the natural teeth.

2. A method of producing a dental bridge comprising modelling a unitary block of non-shrinking porcelain material about a reinforcing frame so as to form a set of teeth, firing said block and coating the same on all sides with a layer of transparent ceramic material having a color corresponding with that of the natural teeth.

3. A method of producing a dental bridge comprising coating a reinforcing frame, including anchoring clips, with a thin layer of non-shrinking porcelain, modelling intermediate elements about said coated frame to form a unitary block of non-shrinking porcelain material, firing said block and coating the same at all sides with a layer of transparent ceramic material having a color corresponding with that of the natural teeth.

4. A method of producing a dental bridge comprising modelling a bridge corresponding to the desired final shape in a pliable material about a reinforcing frame, forming a mold from said model, introducing a non-shrinking porcelain material into the mold, firing said mold and said porcelain material, and coating said molded material on all sides with a layer of transparent ceramic material having a color corresponding with that of the natural teeth and adjacent gum portions respectively.

5. A method of producing a dental bridge comprising coating a reinforcing frame, including anchoring clips, with a thin layer of non-shrinking porcelain, modelling a bridge corresponding to the desired final shape in a pliable material about said coated frame, forming a mold from said model, introducing a non-shrinking porcelain material into the mold, firing said mold and said porcelain material, and coating said molded material on all sides with a layer of transparent ceramic material having a color corresponding with that of the natural teeth and adjacent gum portions respectively.

6. A method of producing a dental bridge comprising modelling a bridge body corresponding to the desired final form in a pliable material about a reinforcing frame, providing said model with prepared artificial teeth, forming a mold from said complete model, providing said frame and artificial teeth within said mold, inserting a non-shrinking porcelain material into said mold, firing said mold, said material, said frame, and said artificial teeth so that said material, frame, and artificial teeth form a unitary block, coating the surface of the block with the exception of the artificial teeth with a layer of transparent ceramic material having a color corresponding with that of the natural teeth and adjacent gum portions respectively.

7. A porcelain dental bridge comprising a reinforcing frame, intermediate elements of non-shrinking porcelain material fired about said frame so as to constitute a unitary block, and a coating of glaze having a color to correspond with that of the natural teeth and adjacent gum portions respectively covering said block on all sides.

8. A porcelain dental bridge comprising a reinforcing frame, intermediate elements including artificial teeth, and non-shrinking porcelain material, said intermediate elements and said material being fired together and surrounding said frame so as to form a unitary block, and a coating of glaze having a color to correspond with that of the natural teeth and adjacent gums respectively secured to the surface of said block with the exception of the artificial teeth.

9. A porcelain dental bridge according to claim 7, said reinforcing frame consisting of a non-oxidizing and non-gas-liberating metallic material.

10. A porcelain dental bridge according to claim 7, said non-shrinking porcelain material comprising principally refractory components having a high melting point and melting fluxes for forming an intimate connection with the refractory components and the reinforcing frame.

11. A porcelain dental bridge according to claim 8, said non shrinking porcelain material comprising principally refractory components having a high melting point and melting fluxes for forming an intimate connection with the refractory components, the reinforcing frame and said artificial teeth.