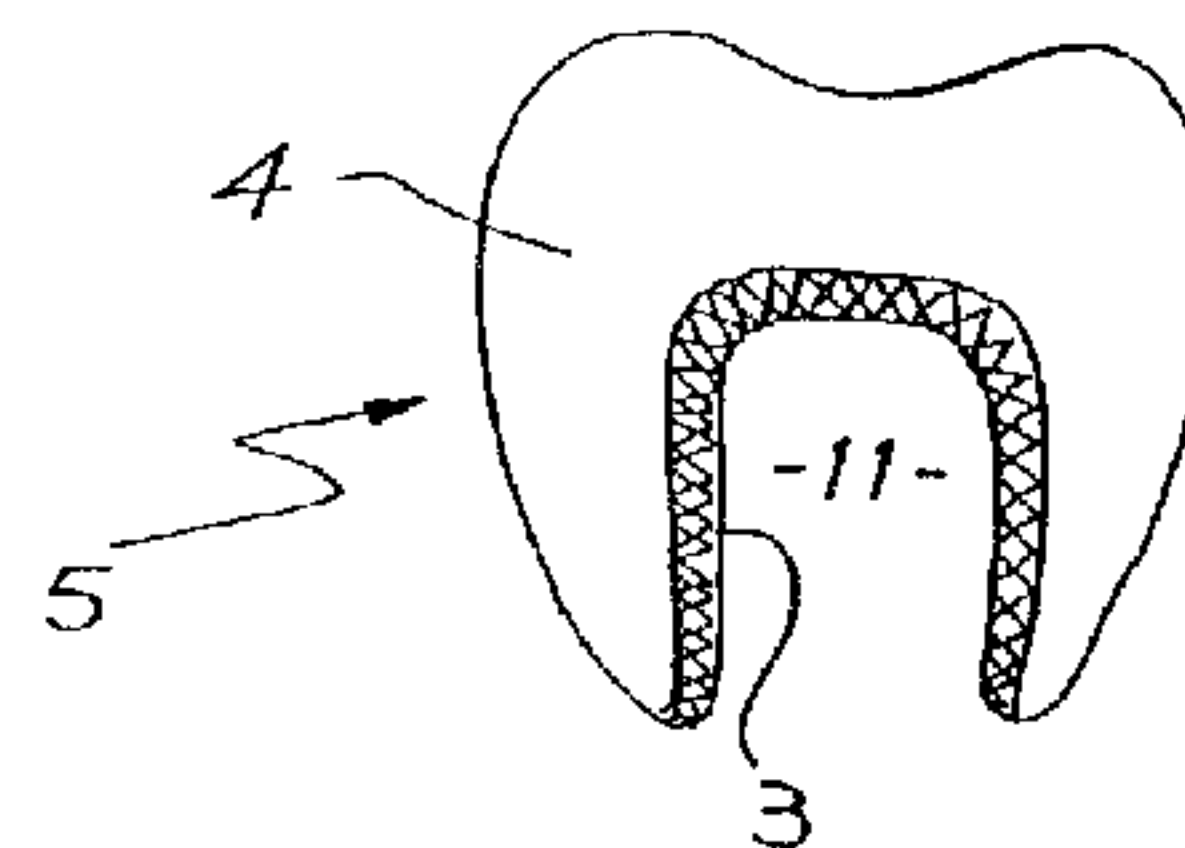
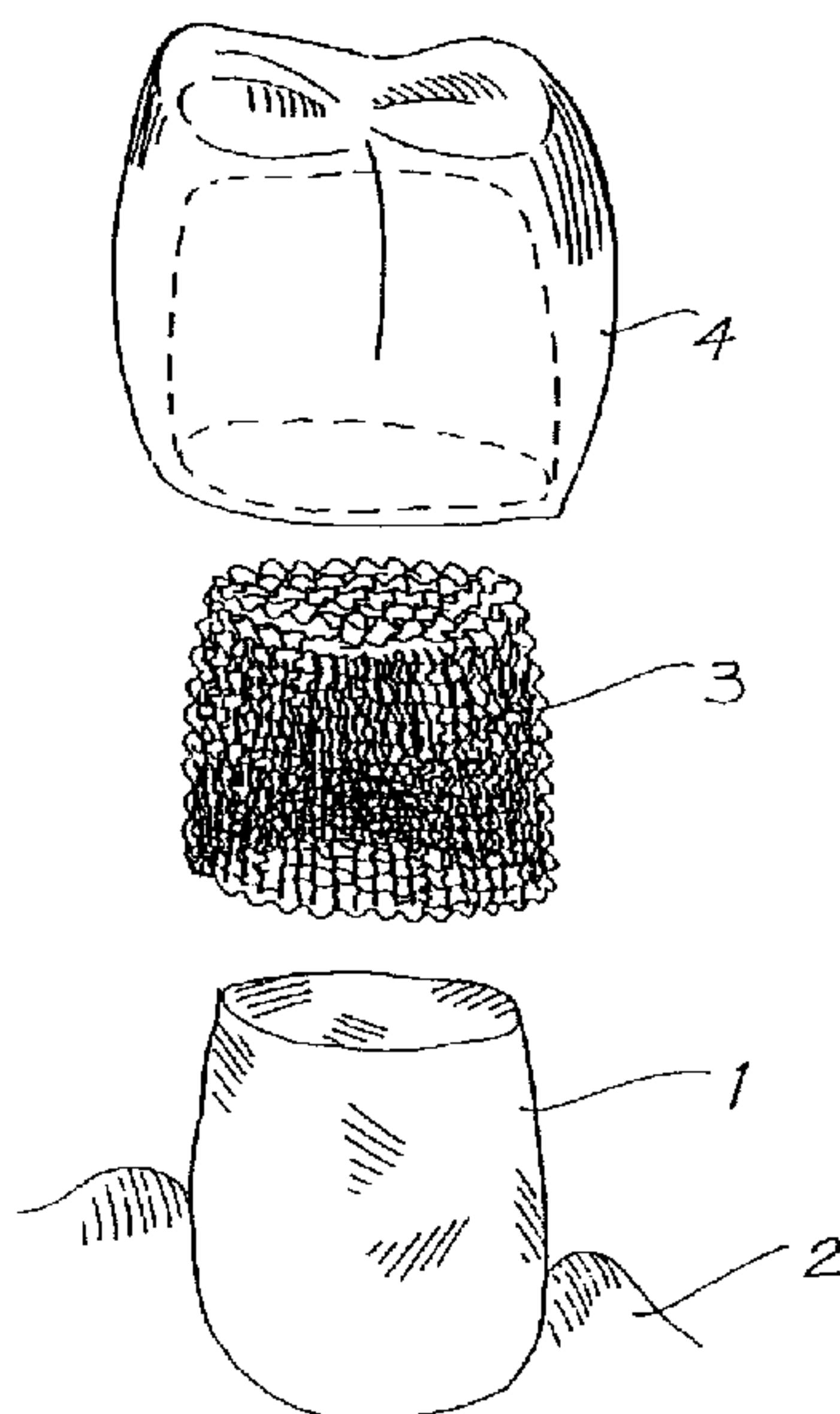


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 (54) **COURONNE DENTAIRE**
 (54) **DENTAL CROWN**



(57) Construction destinée aux couronnes dentaires, aux couches protectrices, aux inlays et similaires comprenant un treillis en acier inoxydable (3) formé de façon à adhérer uniformément au morceau de dent préparé (1) et lié intégralement à la cavité (11) du corps d'une couronne (4) de manière à former une couronne intégrale (5) prête à l'utilisation. On peut faire adhérer celle-ci (5) au reste de dent (1) selon la technique traditionnelle, par exemple à l'aide d'une charge dentaire. Le corps de la couronne (4) ainsi que le treillis (3) sont liés de manière très résistante par blocage mécanique grâce à la texture du treillis.

(57) A construction applicable to dental crowns, facings, inlays, and the like including a stainless steel wire mesh (3) shaped to fit closely over a prepared tooth remnant (1), and being integrally bonded to a cavity (11) of a crown body (4) so as to form an integral crown (5) ready for use. The integral crown (5) can be adhered to the remnant (1) in a conventional manner, for instance by using dental filler. The body (4) and mesh (3) are very strongly joined by a mechanical interlock action by virtue of the mesh texture.

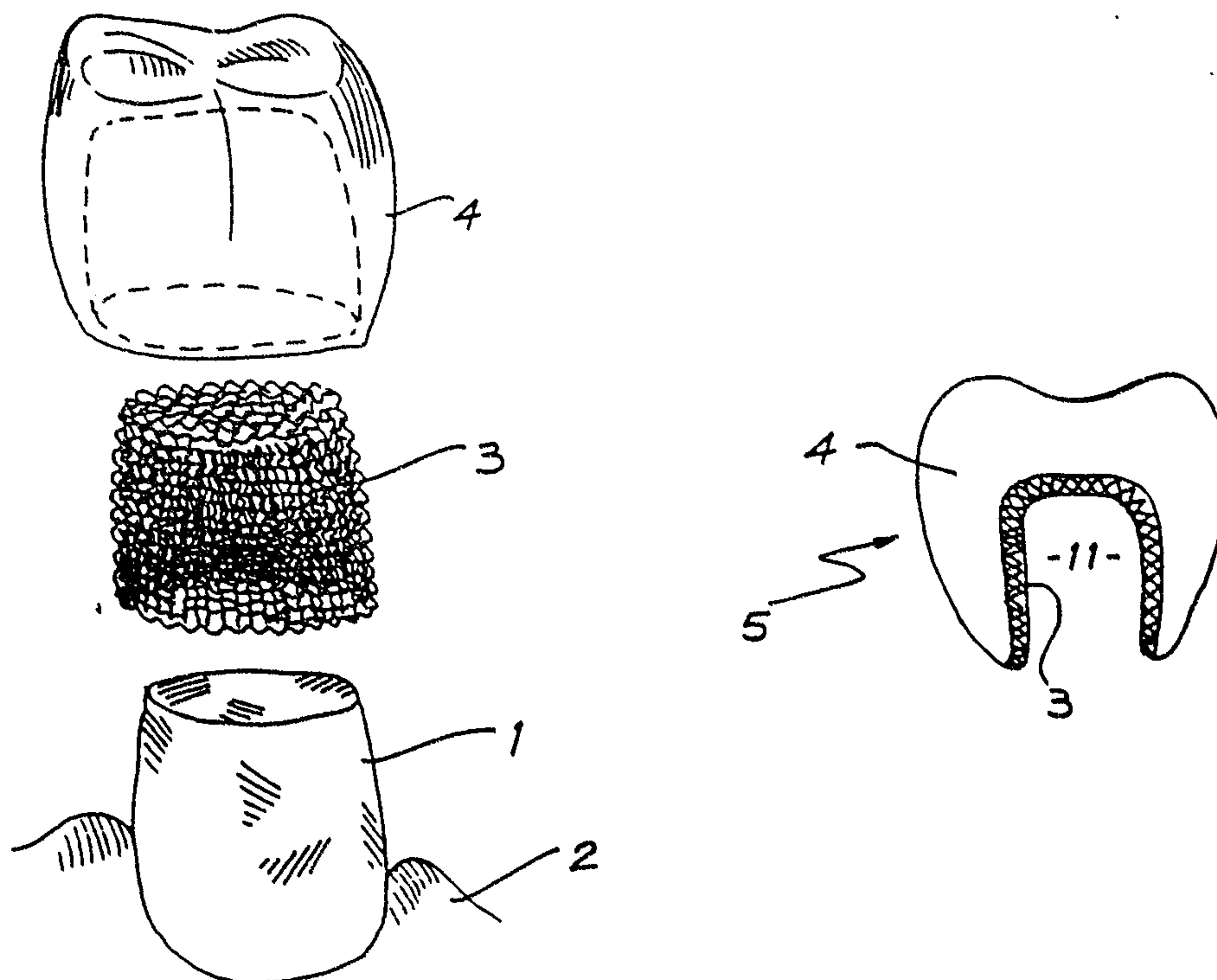


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(21) International Application Number: PCT/AU91/00300 (22) International Filing Date: 5 July 1991 (05.07.91) (30) Priority data: PK 1780 16 August 1990 (16.08.90) AU (71)(72) Applicant and Inventor: FUNG, John [AU/AU]; 627 George Street, Sydney, NSW 2000 (AU). (74) Agent: F.B. RICE & CO.; 28a Montague Street, Balmain, NSW 2041 (AU). (81) Designated States: AT, AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), CH, CH (European patent), CI (OAPI patent), CM (OAPI patent), CS, DE, DE (European patent), DK, DK (European patent), ES, ES (European patent), FI, FR (European patent), GA (OAPI patent), GB, GB (European patent), GN (OAPI patent), GR (European patent), HU, IT (European patent), JP, KP, KR, LK, LU, LU (European patent), MC, MG, ML (OAPI patent), MN, MR (OAPI patent), MW, NL, NL (European patent), NO, PL, RO, SD, SE, SE (European patent), SN (OAPI patent), SU ⁺ , TD (OAPI patent), TG (OAPI patent), US.		Published <i>With international search report.</i>

(54) Title: DENTAL CROWN**(57) Abstract**

A construction applicable to dental crowns, facings, inlays, and the like including a stainless steel wire mesh (3) shaped to fit closely over a prepared tooth remnant (1), and being integrally bonded to a cavity (11) of a crown body (4) so as to form an integral crown (5) ready for use. The integral crown (5) can be adhered to the remnant (1) in a conventional manner, for instance by using dental filler. The body (4) and mesh (3) are very strongly joined by a mechanical interlock action by virtue of the mesh texture.

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"DENTAL CROWN"FIELD OF THE INVENTION

This invention relates to the construction of dental prosthesis. A wide variety of crowns, inlays, facings and
5 similar structures can be produced in accordance with the invention.

PRIOR ART

When replacing a portion of a damaged tooth, for example by the use of a dental crown, either one of two
10 practices are common. The dental crown can be produced wholly from porcelain having an outer shape moulded to approximate the desired tooth shape and an inner cavity which is inserted over and cemented to the tooth preparation which is ground from the natural tooth.
15 Alternatively, a porcelain cap is fused to a metal core which has been formed so as to be cemented to the tooth preparation. While the second mentioned alternative is superior from a functional point of view as it can bear some mastication force, it is inferior from an aesthetic
20 point of view. However, it is still vulnerable to damage as the bond between the porcelain and the metal core is a relatively weak oxide which may allow full depth pieces of the porcelain cap to fracture from the metal core and come free from the tooth.

25 DESCRIPTION OF INVENTION

The present invention, in one broad form, can be described as a dental prosthesis (defined herein as a crown, inlay, facing or the like) comprising an outer body
30 functionable as a tooth, or part thereof, and being fused or bonded to an initially partially flexible, textured insert which can be cemented to a tooth remnant.

By textured, it is meant that the interface between the insert and the body has a texture to provide a positive mechanical interlock.

35 It is preferred that the insert is stainless steel

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mesh, or other corrosion resistant tensile material mesh. The mesh supports the porcelain as well as provides a strong mechanical interlocking of the porcelain to the mesh by way of the oxide bonding material.

5 In one preferred embodiment the body is porcelain cast to approximate a desired tooth shape and is bonded to the mesh by baked porcelain. In an alternative preferred embodiment the body is porcelain formed about the mesh by baking to approximate a desired tooth shape.

10 The completed prosthesis device may be bonded to a prepared tooth remnant using dental cement, filling material or adhesive.

The prosthesis may be in a number of forms including a full crown, an inlay, a cosmetic facing, or an integral tip and facing.

15 In another broad form the invention can be described as a method of manufacturing a dental prosthesis comprising:-

shaping a textured corrosion resistant flexible
20 insert to a general cup shape so as to fit over an outer surface of a prepared tooth remnant, forming a dental outer body and bonding the body to the insert.

Preferably, in one alternative, the forming and bonding of the body occur as one step. In another
25 alternative the body is semi-formed before inserting the insert and then finally fired causing bonding of the body to the insert.

The body may be a heat fusible porcelain.

The insert may be stainless steel mesh.

30 In one procedure, the tooth remnant is prepared and a mould taken in rubber, or the like. The mesh is then custom shaped in a dental laboratory to suit the mould before inserting the mesh into the body for final firing. The custom crown, or the like, is then a substantially
35 perfect fit to the prepared remnant.

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In an alternative procedure, a dental surgery is supplied with a range of sizes of fully formed crowns, or the like, from which an appropriate size is selected to suit the remaining teeth. The mesh will be sized
5 according to the tooth size so as to ensure adequate strength, and the tooth remnant is prepared to be just slightly smaller than the mesh. Dental filling material, or the like, is placed in the cavity defined by the mesh and the crown, or the like is pressed into place on the
10 remnant and held still for the curing period.

DESCRIPTION OF DRAWINGS

By way of example only, various embodiments of the invention will be described with reference to the accompanying drawings in which:

15 Fig. 1 is a disassembled sketch of a prosthetic crown remnant in accordance with the invention;

Fig. 2 is a diagrammatic sketch of an inlay according to the present invention; and

20 Fig. 3 is a diagrammatic sketch of an integral tip and facing in accordance with the present invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

Fig. 1 shows a tooth preparation 1 in the patient's jaw 2, the post having already been prepared by conventional dental grinding techniques to form a strong,
25 healthy post to which the crown may be attached.

A porcelain crown 4 is shaped so as to simulate the functioning and appearance of the natural tooth in a healthy condition. Intermediate the post 1 and the crown 4 is a stainless steel mesh skeleton 3 which is
30 bonded in a mechanically interlocking manner, by virtue of its mesh structure, to the inside cavity of the crown 4. The complete crown 5 incorporating the stainless steel mesh 3 and the porcelain crown 4 is adhered to the post 1 by using conventional dental cement, filling material or
35 adhesive.

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The flexibility of the stainless steel (or other suitable material) mesh 3 provides a complete crown structure 5 which has much more give than does a crown produced by conventional techniques. Thus, crown 5 is much less likely to failure. Moreover, because the texture of the mesh provides an interlocking bond with the porcelain, if damage does occur to the porcelain it will tend to remain wholly fixed in place rather than fragment and become loose in the patient's mouth.

10 The relatively thin thickness of the stainless steel mesh 3 allows a relatively thick body of porcelain in the crown 4 and thus provides very good aesthetics qualities which are much closer to those of natural teeth than is the case of traditional crowns formed on solid metal cores.

15 Also to improve aesthetics, the porcelain material may be specified such as an outer enamel porcelain layer, intermediate dentine porcelain layer, and inner opaque porcelain encasing the mesh 3.

20 The completed crown 5 can be formed and fitted in any one of a variety procedures. Standard porcelain shells 4 can be produced in varying sizes and shapes and kept on hand in the dental surgery. The stainless steel mesh 3 is shaped to suit a prepared tooth preparation 1, and a thin layer of porcelain mixture painted on to the mesh, which
25 is then inserted into a suitable pre-made crown 4 and baked. This baking and finishing procedure will likely require only approximately one hour and can then be bonded to the tooth preparation using dental cement. Thus a high quality, permanent crown can be fitted in a single visit
30 to the dental surgery.

In another procedure, an impression is taken of the prepared tooth remnant which can be sent to a dental laboratory for custom finishing and returned to the dentist for cementation. Meanwhile a temporary crown is
35 fixed to the prepared tooth remnant, as is conventional

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practice. The stainless steel mesh 3 is shaped to the tooth post in the laboratory and the mesh 3 then has a thick porcelain mixture painted on and is baked in a mould in order to form the permanent crown.

5 In a particularly time efficient procedure, completed, fully fixed crowns 5 are produced in a dental laboratory in a variety of sizes for each tooth type. The mesh 3 for these crowns 5 will be sized according to the outer size of the crown 5 so as to ensure sufficient
10 porcelain thickness for strength, but as large as possible inner cavity 11 so as to allow as large as possible tooth remnant 1. In the surgery the dentist selects the appropriately sized crown 5 and prepares the remnant 1 to the appropriate size being just slightly smaller than the
15 cavity 11. Dental filling material is placed into the cavity 11 and the crown 5 put in place on the remnant 1.

The filler material is plastic, or paste like, and fills in any space between the mesh 3 and the remnant 1. The filler material cures, normally in about 5 minutes,
20 and the job is complete.

Thus the patient may select to have a custom shaped crown in order to best duplicate the true shape of the natural tooth being repaired or a cheaper but equally strong alternative. In all cases the crown may be
25 mechanically superior to previously known crowns.

Fig. 2 shows an application of the invention in which an inlay is applied to the damaged portion of a tooth where the damage is not so extensive as to require a complete crown. The damaged section of the tooth is
30 ground out using traditional methods. After preparing the natural tooth remnant in this way, the stainless steel mesh 3 is shaped so as to fit the prepared surface area to be inlaid. Next, porcelain mixture can be painted on to the mesh 3 and baked in a suitable mould, or a premoulded
35 porcelain inlay can be baked on to the mesh by firstly

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painting a thin layer of porcelain mixture to the mesh 3.

Once the inlay mesh/porcelain composite is finished, it can be adhered to the prepared tooth using dental cement.

- 5 Such an inlay produces a repair of very high aesthetic quality and very good functional strength and durability.

- 10 Fig. 3 shows a tooth 8 which has suffered a fractured tip and which has been repaired using a combined tip-facing according to the present invention. The natural tooth 8 is again ground to shape and a metal mesh 3 shaped over the tooth front surface and biting tip. A porcelain facing and integral tip is then formed on, or bonded to, the mesh which is then cemented to the damaged tooth 8. This repair results in a tooth of sufficient strength to allow normal mastication, in conjunction with the normally mating tooth 10.
- 15

CLAIMS

1. A dental prosthesis comprising an outer body functionable as a tooth, or part thereof, and being fused or bonded to an initially partially flexible, textured insert which can be cemented to a tooth remnant.
2. A dental prosthesis of claim 1 wherein the insert is composed of a mesh structure.
3. A dental prosthesis of claim 2 wherein the mesh is comprised of a woven tensile filament.
4. A dental prosthesis of claim 3 wherein the filament is corrosion resistant metal or wire.
5. A dental prosthesis of claim 4 wherein the metal mesh is fused directly to the body.
6. A dental prosthesis of claim 5 being a crown, an inlay, or a facing.
7. A method of manufacturing a dental prosthesis comprising the steps of:
 shaping a textured corrosion resistant flexible insert to a general cup shape so as to fit over an outer surface of a prepared tooth remnant, forming a dental outer body and bonding the body to the insert.
8. A method of claim 7 wherein the insert is a mesh comprised of a woven tensile filament material.
9. A method of claim 8 wherein the body is of porcelain and is formed by moulding and firing, the mesh being inserted into the mould body before a single, complete firing process.
10. A method of claim 8 wherein the mesh is coated with a porcelain paint and inserted into the body after an initial, partial firing process of the body, the body and mesh combination then being further fired to complete the firing process and bond the mesh to the body.
11. A method of manufacturing and fitting a dental prosthesis comprising the steps of:

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forming a plurality of prostheses, each of an outer body and inner mesh bonded integrally to the body, in a range of body sizes to provide a stock supply of ready to fit prostheses,

selecting a suitable sized and shaped prostheses from said stock supply,

preparing a tooth remnant to suit the selected prostheses, and

adhering or bonding the selected prostheses to the remnant using a dental filler or the like.

12. A method of manufacturing and fitting a prosthesis comprising the steps of:

preparing a tooth remnant and taking a mould of the tooth remnant to duplicate its size and shape,

forming a metal mesh insert to conform closely to the mould,

forming a tooth body about the mesh and rigidly bonding the body and mesh together in an integral prosthesis, and

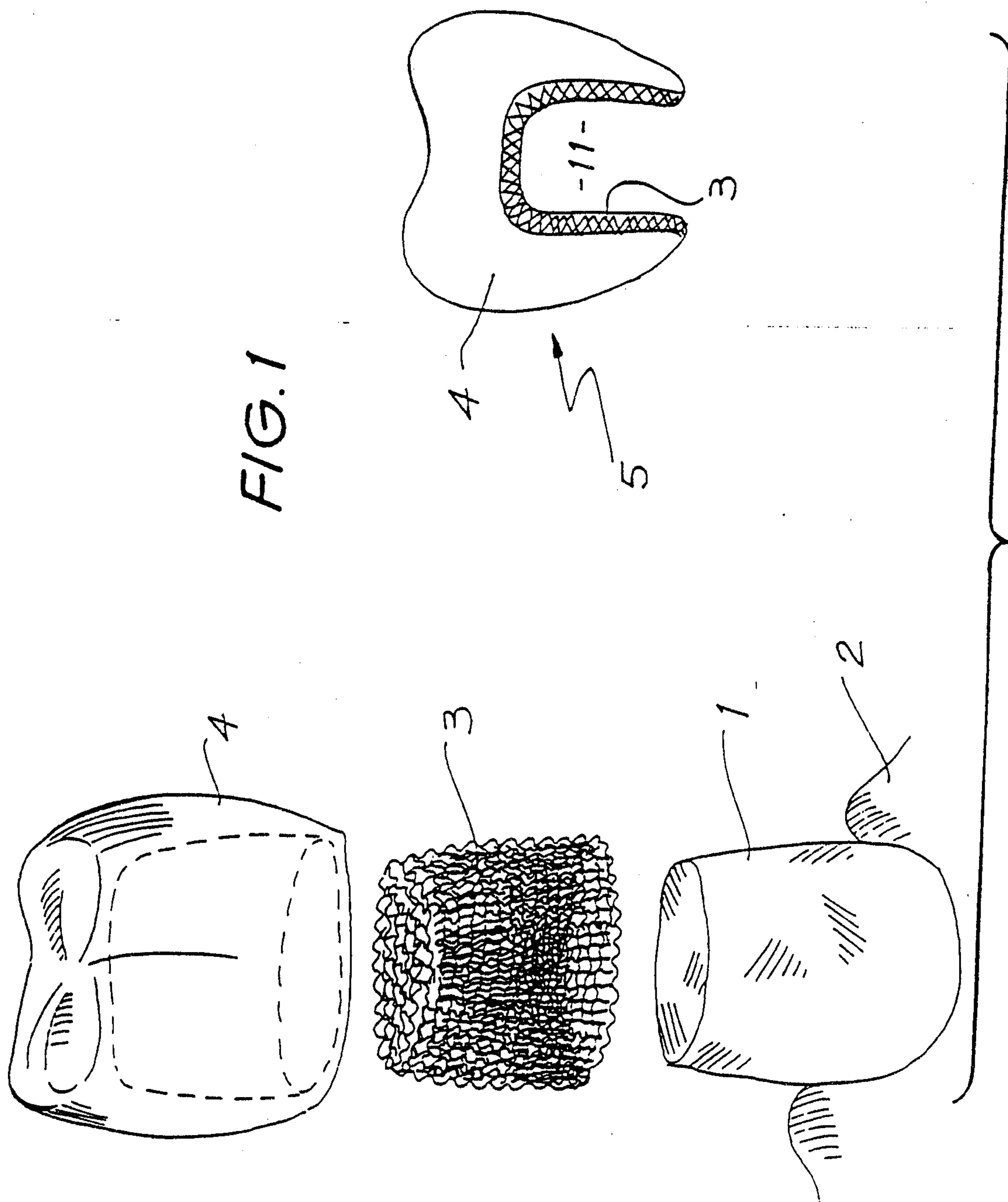
fitting and adhering the prosthesis to said remnant by dental filler or the like.

13. A method of claim 7 wherein the body is applied in an uncured or unfired form to the insert and shaped to a desired tooth, or tooth portion, shape before curing or firing.

14. A stock set of prostheses comprising a plurality of prostheses each as defined in claim 1, the prostheses being in a range of sizes, shapes and colours.

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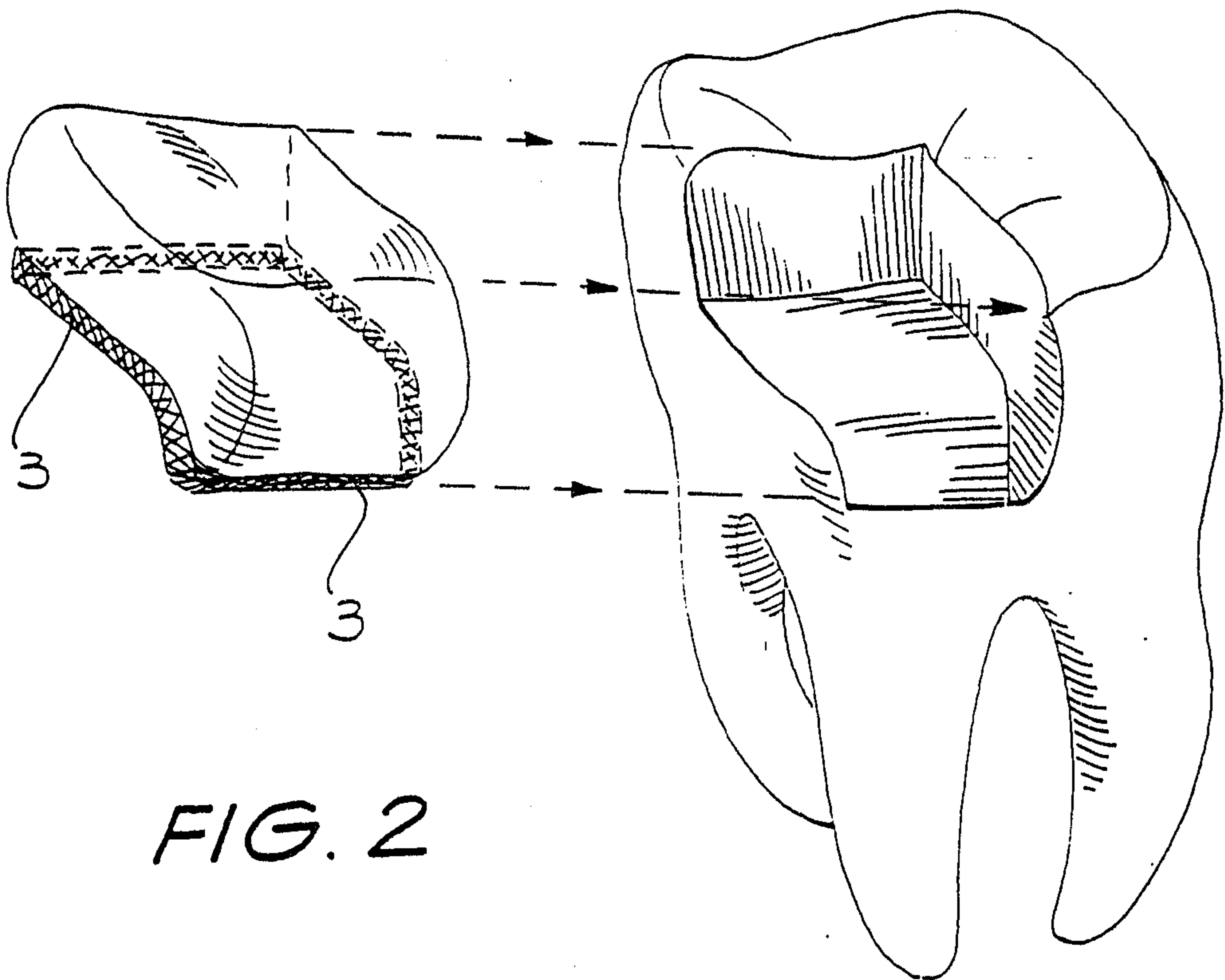


FIG. 2

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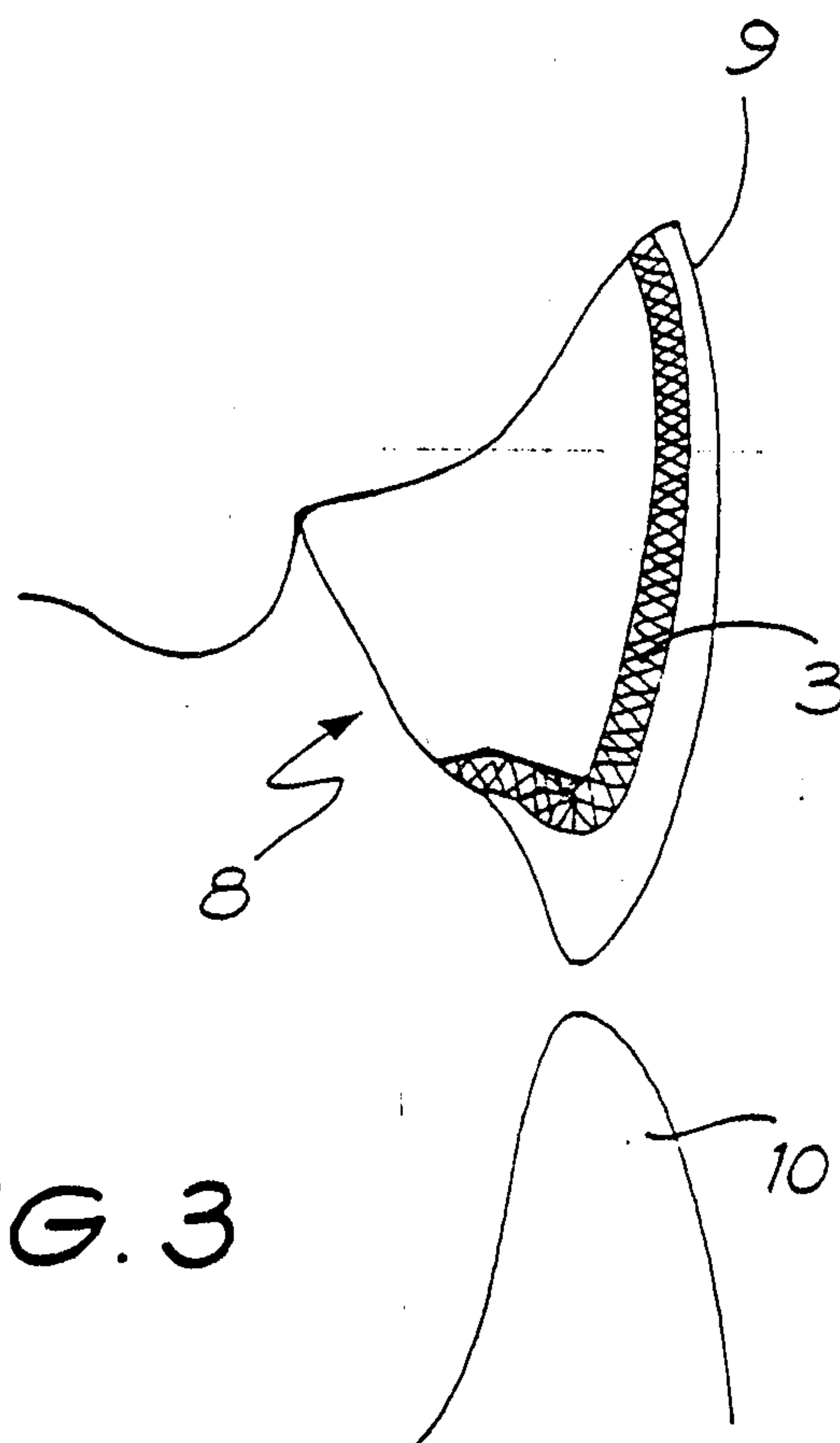


FIG. 3

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