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DENTAL CROWN AND METHOD OF PRODUCING THE SAME

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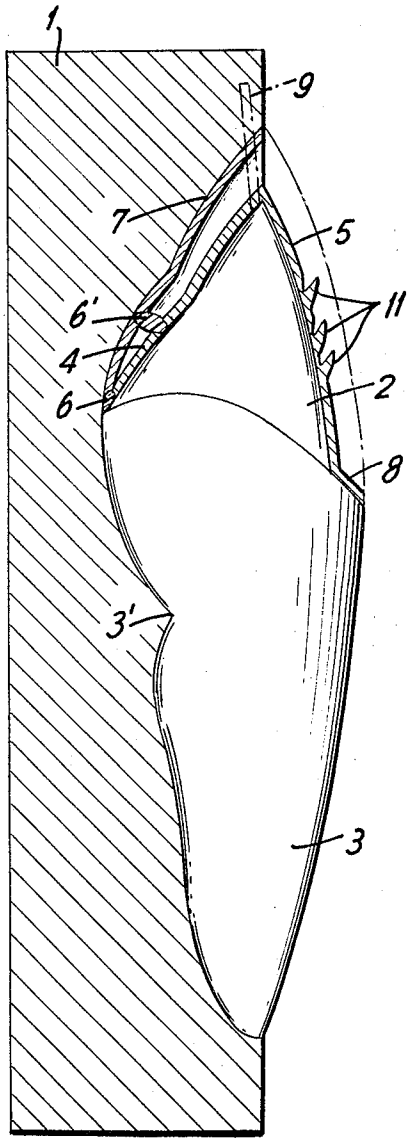

FIG. 1

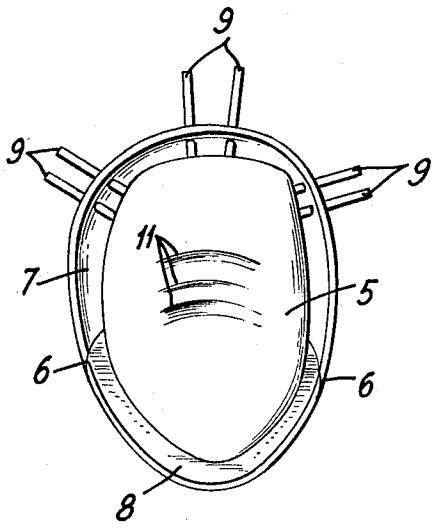

FIG. 2

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DENTAL CROWN AND METHOD OF PRODUCING THE SAME

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In dentistry, the crowns which are to surround a damaged tooth which risks splitting or breaking, unless it is repaired by means of mere inlays, are used to a large extent, since it is now desired to retain as long as possible the patient's own teeth.

Three types of crowns are known at the present time:

An entirely metallic crown which was originally only made of gold, but which, since the discovery of stainless steel, can also be made of such stainless steel;

The so-called jacket crown which is made of porcelain or synthetic material and surrounds, after the manner of metal crowns, the tooth throughout its periphery;

The so-called combined aesthetic crown which is made of metal and the outwardly apparent surfaces of which carry a cover of porcelain or a synthetic or artificial material, the color and appearance of which are those of natural teeth.

Metal crowns may be constituted by a ring to which is welded the section forming the occluding surface for premolar and molar teeth, but they are preferably cast as a whole, whatever may be the type of the tooth to be protected. Such crowns are very strong and resist perfectly the stresses produced by mastication and the anchoring of prostheses, but their appearance is not pleasing and they make the mouth of the patient look older, since they interrupt the natural sequence of teeth. The so-called jacket crowns, when they are properly made, cannot be distinguished from natural teeth, but their resistance is much lower than that of a metal crown and, furthermore, they are very expensive and cannot be supplied for the vast majority of patients. Lastly, the so-called combined or faced crowns are less expensive and stronger than the jacket crowns, but the cover of porcelain or synthetic material is not rigidly anchored therein and there is a risk of an infiltration of the liquids carried by the mouth between the metal section of the crown and the cover, so that the latter may be discolored or even become loose.

My invention has for its object not only the production of an aesthetic crown which may be executed at a cost price within reach of most people, which is furthermore very strong and fluid tight, so as to prevent any infiltration, but also a method for producing same, which may be executed with a very great ease and accuracy. My improved aesthetic faced crown is characterized by the fact that it includes a double wall, only the inner wall being in direct contact with the stump of the tooth to be crowned, to which stump said wall is sealed, whereas the outer wall is apparent to view. Said outer wall is constituted by a metal section enclosing the entire surface of the tooth to be crowned, except the vestibular surface of the upper maxillaries in the case of the incisor and canine teeth block or the vestibular and occluding surfaces, in the case of the premolars and of the lower molars. In front of these latter surfaces are provided sections of porcelain or synthetic resin or the like material, the color of which is than of natural teeth. Between the inner wall and the metal section of the outer wall, there is formed an at least partial gap which is advantageously stayed by metal rods which serve also as means for retaining the non-metallic section of the outer wall. Furthermore, the outer surface of the inner wall facing the non-metallic section of the outer wall is made rough and, for instance, it may be provided with oblique cuts, so as

to ensure a perfect adherence of the cover to said surface. The inner wall is also provided, flush with the gum on the vestibular surface, with a shoulder or flange extending with a gradually reduced thickness up to the two points of connection between the inner wall and the free edge of the metal section of the outer wall.

Such a crown for a dental stump, which is suitably prepared inside the patient's mouth, is obtained in the following manner:

After forming a model tooth of wax over the stump model obtained starting from a cast, a mold is made of plaster of Paris of the stump including the tooth in its desired final condition, the shape of which is that of the crown to be executed. Said wall provided with the different surfaces corresponding to the metal sections of the outer wall is then cut in two along an axial plane, after which the wax model is taken off the stump and over the latter, the model of the inner wall is formed by executing a sort of thimble or cap of wax, following which the two sections of the die are positioned against each other in the position occupied by them before they had been cut into two and some wax is inserted over the section of the mold facing the location of the metal section of the outer wall, so as to form the model of said outer wall, after which the stump with its wax cap is replaced in the die; after removal of one half of the latter, so as to allow the interconnection of the wax models of the metal walls firstly on one side and then on the other side, the model of the metal section of the crown may be removed from the stump and is ready for the casting which is performed in the conventional manner.

In order to provide the crown with the metal rods spacing the metal walls and serving for anchoring the wall of porcelain or synthetic material, I use small sections of wire of a metal having a melting point which is higher than the melting point of the alloy which is to be cast to form the crown. Preferably, after slightly heating said wire sections these are fitted transversely into the two waxed walls of the model of the metal section of the crown. Said rods remain in position during the casting, even after the removal of the wax through melting or burning, for instance, and they are thus made rigid with the metal forming the crown, the alloy forming them being preferably of the same type as that forming the crown.

In order to still further increase the adherence between the non-metallic section of the outer wall with the inner wall, the apparent surface of the latter is made rough, for instance through oblique cuts, so that the resin, porcelain or the like artificial material forming the apparent surface of the crown may engage same. To the model thus obtained, there are also secured in the conventional manner, on the surface facing the tongue or the palate, casting rods and the actual casting is then performed in the conventional manner inside a suitable covering material forming the mold.

In the accompanying drawing:

FIG. 1 shows, by way of example, on a very enlarged scale, a longitudinal cross-section of the wax model of the metal section of a crown for a canine tooth, positioned with the uncut stump inside one half of the die in which it has been obtained, while:

FIG. 2 is a view of the vestibular surface of said model.

As illustrated, **1** designates the die or mold in which is fitted the stump **2** including its root section **3**, which latter is provided with a notch **3'** on the side corresponding to the tongue or the palate to serve as a reference mark for the insertion of the model inside the die **1**. The upper section **2** of the stump is capped by the inner wall of the crown constituted by a section facing the tongue or the palate **4** and a vestibular section **5**. To

said inner wall sections is secured, through the agency of a wax connection 6, the model 7 of the metal section of the outer wall. In certain cases, it is of interest to use a second wax connection 6' located slightly higher than the connection 6, so as to reduce the breadth of the gap between the two walls 4 and 7. On the vestibular side facing the location of the gum, the outer surface of the inner wall section 5 is provided with a flange 8 terminating flush with the outer surface of the root 3 of the tooth. The retaining rods 9 which are clearly shown in FIG. 2 and are fitted subsequently in the inner and outer walls of the model, are shown in FIG. 1 merely symbolically in dot-and-dash lines. Similarly, the dot-and-dash line drawn on the vestibular side from the apex of the outer wall 7 towards the flange 8 shows the outline of the cover forming the apparent surface of the crown, which is secured in the conventional manner, so as to adhere to the metal parts 4–5–7–8 through the agency of the rods 9 and of the ridges 11 obtained through oblique cuts formed in the vestibular surface of the inner wall section 5.

As clearly apparent from inspection of the drawing, the inner wall 4–5 of the crown is sealed over the stump 2 of the tooth and since it has only to resist reduced stresses, it may be comparatively thin, so that, for its execution, a sheet of wax of a 0.70 mm. thickness may be used. In contradistinction, for the section 7 of the outer wall, which includes also, for the upper molar and premolar teeth, occluding surfaces, the use of a sheet of wax of a thickness of 0.40 to 0.60 mm. is preferable. Thus, the outer surface of the outer wall of the crown supporting the stresses due to mastication and, possibly, those produced by the incorporation of a prothesis, is much stronger and may resist all stresses without any deformation.

What I claim is:

1. An aesthetic dental crown for patient's tooth stumps, comprising an inner metal wall adapted to cap and to be sealed over the tooth stump to be crowned, an outer apparent wall secured over the inner wall, said outer wall including a metal section over the rear surface of the inner wall, a gap between the metal section and the inner wall, and a section of a material having the natural color of the patient's teeth and extending over the front surface of the inner wall.

2. An aesthetic dental crown for patient's tooth stumps, comprising an inner metal wall adapted to cap and to be sealed over the tooth stump to be crowned, an outer apparent wall secured over the inner wall and including a metal section extending over the rear surface of the inner wall, a section of a material having the natural color of the patient's teeth and extending over the front surface of the inner wall, and stays rigidly interconnecting the front and rear sections of the outer wall with the corresponding parts of the inner wall.

3. A dental crown for a tooth stump having a front portion and a rear portion comprising an inner wall, and an outer wall connected to the inner wall at the bottom of the rear portion of the crown and extending upwardly in spaced relationship from the inner wall, said outer wall diverging away from said inner wall from the point of connection to the uppermost portion of the crown, said inner and outer walls being spaced apart both at the top and the sides of the tooth crown, said outer wall terminating in the vicinity of the axial plane of the crown.

4. A dental crown for a tooth stump having a front portion and a rear portion comprising an inner wall, and an outer wall connected to the inner wall at the bottom of the rear portion of the crown and extending upwardly in spaced relationship from the inner wall said outer walls diverging away from said inner wall up to the uppermost portion of the crown, said inner and outer walls being spaced apart both at the top and the sides of the tooth crown, said inner wall having a flange portion at the bottom of the front portion of the crown and having

a front wall spaced inwardly from the interior end of the flange portion, and a section of material having a natural color of the patient's teeth extending over the front surface of the inner wall and into the space between the inner and outer walls on both sides and the top and overlying the flange of the inner wall.

5. A method for producing an aesthetic double-walled dental crown for patient's tooth stumps, comprising forming a cast of the stump, capping the stump cast with a wax model of the upper section of the original shape of the tooth, forming a mold with the cast of the stump and the wax model capping it, cutting the mold along an axial plane to open the mold, removing the wax model, capping the stump cast with a wax model of the inner wall of the crown to be obtained, forming a wax model for the inner surface of the rear section of the outer wall of the crown in the mold, reinserting the stump cast with the wax model of the inner wall into the mold and interconnecting the wax models of the two walls, removing the double model thus obtained, inserting wire sections of a metal, the melting point of which is higher than that of the metal which is to form the crown, between the cooperating surfaces of the models of the two walls, and casting the metal which is to form the crown using the double model, and fitting a front wall section of a material, the color of which approximates the natural color of the patient's teeth to the front of the inner wall as a continuation of the rear cast section of the outer wall.

6. A method for producing an aesthetic double-walled dental crown for patient's tooth stumps, consisting in forming a cast of the stump, capping the latter with a wax model of the upper section of the original shape of the tooth, forming a mold with the cast of the stump and model capping it, cutting said mold along an axial plane to open said mold, removing the wax model, capping the stump cast with a wax model of the inner wall of the crown to be obtained, forming a wax model for the inner surface of the rear section of the outer wall of the crown in the mold, reinserting the stump cast with the wax model of the inner wall into the mold and interconnecting the wax models of the two walls, removing the double model thus obtained, and casting the metal which is to form the crown using the said compound model, the front of the inner wall being formed with an at least partly rough front surface, and fitting a front wall section of a material, the color of which approximates the natural color of the patient's teeth to the front of the inner wall as a continuation of the rear cast section of the outer wall, said front wall section engaging the rough surface of the inner wall.

7. A method for producing an aesthetic double-walled dental crown for patient's tooth stumps, consisting in forming a cast of the stump, forming a reference notch in the rear surface of said cast of the stump, capping the latter with a wax model of the upper section of the original shape of the tooth, forming a mold with the cast of the stump and model capping it, cutting said mold along an axial plane to open said mold, removing the wax model, capping the stump cast with a wax model of the inner wall of the crown to be obtained, forming a wax model for the inner surface of the rear section of the outer wall of the crown in the mold, reinserting the stump cast with the wax model of the inner wall into the mold and interconnecting the wax models of the two walls, removing the double model thus obtained, casting the metal which is to form the crown using the double model, and fitting a front wall section of a material, the color of which approximates the natural color of the patient's teeth to the front of the inner wall as a continuation of the rear cast section of the outer wall.

8. A method for producing an aesthetic double-walled dental crown for patient's tooth stumps, consisting in forming a cast of the stump, capping the latter with a wax model of the upper section of the original shape of the tooth, forming a mold with the cast of the stump and

model capping it, cutting said mold along an axial plane to open said mold, removing the wax model, capping the stump cast with a wax model of the inner wall of the crown to be obtained, forming a wax model for the inner surface of the rear section of the outer wall of the crown in the mold, reinserting the stump cast with the wax model of the inner wall into the mold and interconnecting the wax models of the two walls, removing the double model thus obtained, inserting wire sections of a metal, the melting point of which is higher than that of the metal which is to form the crown between the cooperating surfaces of the models of the two walls, inserting a wax pad at a point intermediate of the length of the gap between the model of the rear section of the outer wall and the section of the inner wall facing the latter, casting the metal

which is to form the crown using the double model, and fitting a front wall section of a material, the color of which approximates the natural color of the patient's teeth to the front of the inner wall as a continuation of the rear cast section of the outer wall.

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