May 5, 1931. E. P. SCHWARTZ 1,803,680

TOOTH CROWN AND METHOD OF FORMING AND APPLYING THE SAME

Filed Oct. 14, 1927

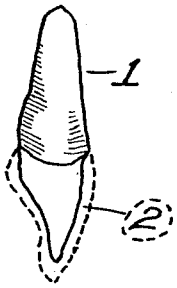


Fig. 1.

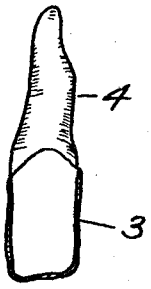


Fig. 2.

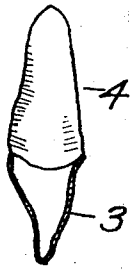


Fig. 3.

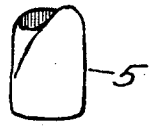


Fig. 4.



Fig. 5.

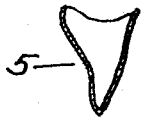


Fig. 6.

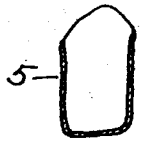


Fig. 7.

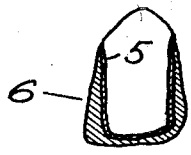


Fig. 8.

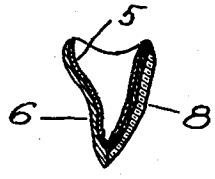


Fig. 9.

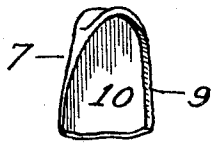


Fig. 10.

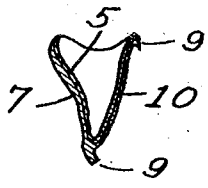


Fig. 11.

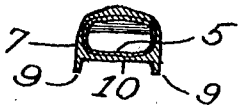


Fig. 12.

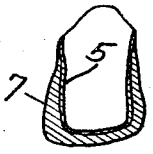


Fig. 13.

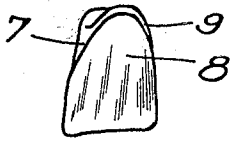


Fig. 14.

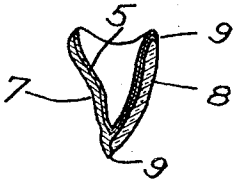


Fig. 15.

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By Hughes & Wagner

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UNITED STATES PATENT OFFICE

ELI P. SCHWARTZ, OF ST. LOUIS, MISSOURI, ASSIGNOR TO SCHWARTZ BROS. DENTAL LABORATORY COMPANY, A COPARTNERSHIP COMPOSED OF SAID ELI P. SCHWARTZ AND LOUIS R. SCHWARTZ, BOTH OF ST. LOUIS, MISSOURI

TOOTH-CROWN AND METHOD OF FORMING AND APPLYING THE SAME

Application filed October 14, 1927. Serial No. 229,697.

This invention relates to artificial crowns for teeth, and to methods of forming the crowns and crowning the teeth, respectively.

Hitherto in some instances, artificial crowns were formed of thin shells of twenty-two-carat gold, the labial wall of which was soldered to the approximal and lingual wall section. The thinness of the walls and the softness of the twenty-two-carat gold rendered the crown highly malleable, so that it could be easily manipulated closely to fit the cusp or natural crown of the tooth at the gingival line, and to fit the other portions of the cusp as closely only as the desired external configuration of the artificial crown would permit, the crown having been attached to the cusp by a suitable cement, which, also, served to fill the interstices that inevitably resulted between the cusp and the interior surface of the crown on account of the impossibility of intimately fitting this form of crown to the cusp. All cement is more or less soluble in the mouth, and, when the cement that fills the aforesaid interstices and reinforces the wall of the crown that is adjacent thereto begins to dissolve, the malleable crown becomes more or less loose and eventually comes off. Furthermore, the wall of the malleable crown, being very thin, is not well adapted to resist undue stresses that are apt to be encountered in the process of mastication and especially the severe tensile and torsional stresses that are exerted on the crown when the latter is utilized as an anchorage for bridge work.

Esthetic considerations preclude the display of elaborate operations of gold, especially in conspicuous positions in the front teeth; and to this end inlays or slabs of porcelain have been much in favor as a facing for the labial side of the gold crown, since they harmonize so well with the natural tooth structure in color and texture. The porcelain facings are held in place by a marginal flange or band that projects from the labial face of the crown, usually as an extension of the approximal and lingual walls of the crown, the facing being cemented to the retracted labial wall and the flange being manipulated to a retentive shape. These flanges are extremely thin so as to be practically invisible when the facing operation has been correctly performed. However, the softness of the twenty-two-carat highly malleable gold plate that forms the crown limits its usefulness in solidly holding the porcelain.

Accordingly, an object of the present invention is the provision of a crown formed of a comparatively hard metallic substance in order to increase its durability, and to increase its ability to retain a porcelain facing, in the event the crown is of that type.

Another object is the provision of a crown that can be produced with walls of substantial thickness so that it can better withstand the wear and tear of mastication.

Another object is the provision of a crown that is devoid of soldered joints, at which a fracture might result.

Another object is the provision of a crown that can be formed entirely of cast metal outside of the mouth of the patient as an individual job for a prepared tooth, and which, when completed, will intimately fit the prepared portion of the tooth of the patient when it is mounted thereon, and whereby, on account of the resulting absence of interstices between the crown and the tooth, no more cement need be used than is necessary for adhesion only.

Other objects and advantages, more or less ancillary to the foregoing will be apparent in the course of the following description of a preferred embodiment of the invention.

In the accompanying drawings, forming part of this specification, in which like numbers of reference denote like parts wherever they occur,

Figure 1 is a perspective view of an incisor that has been prepared for crowning by the removal of exterior portions of the natural crown, the original configuration being indicated by the dotted line, and the gum and adjacent structure being omitted for the sake of clearness;

Figure 2 is a view looking at the labial side of a model of the prepared tooth, showing a central section through a false crown or shell of wax that has been built up thereon;

Figure 3 is a view looking at the right ap-

proximal side of the same, the false shell being shown in central section;

Figure 4 is a perspective view of the metallic shell that has been cast in a matrix for which the false shell served as a pattern;

Figure 5 is a transverse sectional view of the same;

Figure 6 is a labial-to-lingual longitudinal sectional view of the same;

Figure 7 is a mesial-to-distal longitudinal sectional view of the same;

Figure 8 is a view similar to Figure 7, showing the manner of building up a false crown over the metallic crown as a nucleus;

Figure 9 is a labial-to-lingual longitudinal sectional view of the metallic and false crowns of Figure 8;

Figure 10 is a perspective view of the casting that has been produced by using the structure of Figures 8 and 9 as a pattern;

Figure 11 is a labial-to-lingual longitudinal sectinal view of the same;

Figure 12 is a transverse sectional view of the same;

Figure 13 is a mesial-to-distal longitudinal sectional view of the same;

Figure 14 is a perspective view of the completed crown as it appears when presenting a porcelain labial face; and

Figure 15 is a labial-to-lingual longitudinal sectional view of the same.

The tooth 1 is prepared as shown in Figure 1, the exterior portions 2 thereof being removed to provide space for the artificial crown to be mounted thereon. Impressions are then taken of the upper and lower sets of teeth and models are made from the impressions, as will be understood by those skilled in the art. A false crown 3 of wax or other suitable material is then built up on a model 4 that has been made of the prepared tooth, as shown in Figures 2 and 3; and the model and its false crown are embedded in a suitable matrix, after which the wax 3 may be removed in the usual or any suitable manner, leaving the matrix and the embedded model as the counterpart of the metallic crown 5, which is formed by subsequently pouring the molten metal into the matrix in a well-known manner. Gold, alloyed with platinum to harden it, is deemed preferable as a material from which to cast the crown. It will be observed that the wall of the crown 5, shown in Figures 4, 5, 6, and 7, is extremely thin and that it does not extend to the desired external configuration of the tooth as indicated by the dotted line in Figure 1. The purpose in making the crown thin is to enable it to be slightly manipulated, if necessary, to fit closely the prepared tooth in the mouth of the patient.

After the crown 5 has been found to be satisfactory by actual trial in the mouth of the patient, it is placed in its appropriate position on the model of the sets of teeth, and molten wax 6 or the like is built up on the crown 5 as a nucleus until an external configuration of the crown is produced that harmonizes with the adjacent teeth of the set. See Figures 8 and 9. The nucleus crown 5 and its circumjacent false crown 6 are then placed in a suitable matrix or mold, the wax of the crown 6 is then expelled from the mold, leaving the nuclear crown 5 therein, after which a second crown 7 is cast around the first crown 5, all of the apparatus used in performing this process being well-known adjuncts to the operations of mechanical dentistry. The crown 7 unites intimately with the crown 5, welding thereto and shrinking tightly around the same, and thus forming a solid structure of substantial thickness and hardness that is highly resistant to the wear and tear encountered in mastication, and which is especially useful and durable when employed as an anchorage for bridge work. If the full thickness of the wall of the crown were cast in one operation, the resulting shrinkage incident to the cooling of the casting might render it difficult to mount the crown on the prepared tooth. By forming the crown of two circumjacent shells that are cast in succession, however, the intimate adaptation of the crown to the tooth is facilitated, the previously prepared nuclear crown tending to resist undue shrinkage of the exterior crown, and, also, being more easily adjusted to the configuration of the prepared tooth. Moreover, since the crown of the present invention intimately follows the configuration of the prepared tooth, only enough cement need be used to insure adhesion, none being needed for the purpose of reinforcing an ill-fitting wall as in the case of the thin malleable crowns hitherto employed. The fit being tighter, entrance of the solvent fluids of the mouth between the tooth and the crown is practically checked, and moreover, should any of the cement become actually dissolved notwithstanding this precaution, the crown, being tightly fitted, is not as likely to become loose as is a crown of the old type.

In case the crown to be cast is to be of the porcelain-faced type, as illustrated in the drawing, the second wax or false crown 6 entirely covers the exterior surface of the nuclear shell 5 and, also, is built out around the edges of the porcelain slab 8 to form the retentive flange or band 9, that is, of course, cast integral with the exterior shell 7. The porcelain slab 8 is preferably cemented to the intimately fitting labial face 10 and retentive flange 8 of the shell 7. The band 9 of the crown of the present invention is formed of the harder gold casting, and is, therefore, better able to hold its retentive shape than the frail fins or bands of the soft or malleable gold crowns hitherto in use, so that the porcelain slab 8, when inserted, will be solidly and immovably held in place. The

strength of the hard gold alloy enables the band 9 to be formed so as to be practically invisible or unnoticeable, as an inspection of Figure 14 will show, the gold that does show in the figure being positioned under the gum and so concealed from observation.

Having thus fully described this invention, I hereby reserve the benefit of all changes in form, arrangement, order, or use of parts, as it is evident that many minor changes may be made therein without departing from the spirit of this invention or the scope of the following claims.

I claim:

1. The method of forming crowns for teeth which consists in casting the same around a nuclear crown formed from a casting of a model of the prepared tooth in a suitable mold.

2. The method of crowning teeth which consists in forming a nuclear shell by casting and fitting the same on the tooth, removing the shell from the tooth, subsequently forming another shell over the nuclear shell and in intimate union therewith and finally mounting the completed crown on the tooth.

3. A tooth-crown consisting of a plurality of intimately united cast circumjacent layers, and a porcelain labial face portion joined to one of the layers.

4. A tooth-crown consisting of a plurality of circumjacent castings, and a porcelain slab carried by the labial face of the outer casting.

5. A tooth-crown consisting of a plurality of intimately united circumjacent layers of a hard gold alloy presenting a marginal flange on the labial face portion and a porcelain slab carried by said flange.

6. A tooth crown consisting of a plurality of circumjacent castings and a slab of material different from the material of said castings carried by the labial face of the outer casting.

7. A tooth crown consisting of a plurality of circumjacent castings and a slab of material different from the material of said castings carried by the labial face of one of the castings.

8. The method of forming crowns for teeth which consists in casting the same around a nuclear crown formed from a casting of a model of the prepared tooth in a suitable mold, providing the same with a marginal retaining flange and finally affixing a slab of material within said flange.

In testimony whereof I hereunto affix my signature.

ELI P. SCHWARTZ.