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DENTAL CROWN AND BRIDGE STRUCTURE.
APPLICATION FILED DEC. 19, 1911.

1,057,192.

Patented Mar. 25, 1913.

FIG. 1.

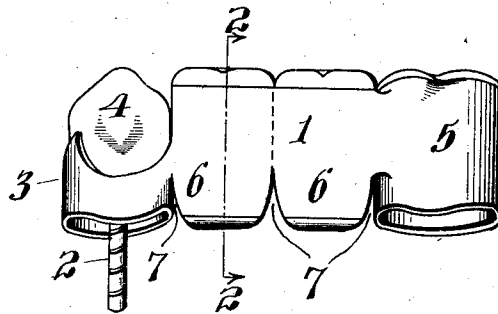


FIG. 2.

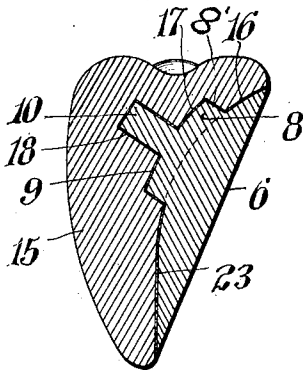


FIG. 3.

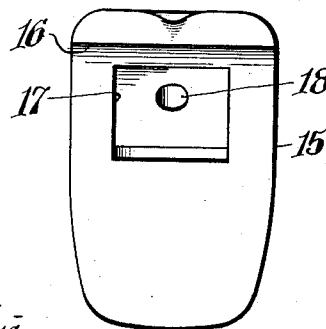
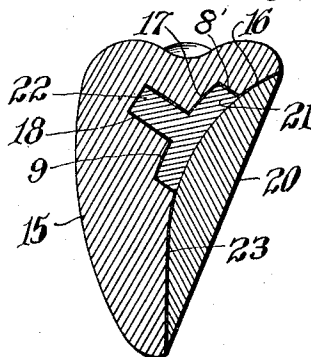


FIG. 4.



WITNESSES

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DENTAL CROWN AND BRIDGE STRUCTURE.

1,057,192.

Specification of Letters Patent.

Patented Mar. 25, 1913.

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To all whom it may concern:

Be it known that we, GEORGE L. WERNET and HENRY A. COLLETT, citizens of the United States, and residents of Philadelphia, county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Dental Crown and Bridge Structures, of which the following is a specification.

Our invention relates to improvements in dental crown and bridge structures and includes a new and novel improved construction of bridge for supporting the teeth in the posterior part of the mouth, that is to say, the molars and bicuspid, as well as of the teeth themselves.

One object of our invention is to combine the teeth and the bridge so as to produce such correlation of the two that the capacity of the teeth to withstand pressure during mastication or at other times is greatly increased.

Another object of our invention is to provide improved means whereby a tooth, or crown, if broken, may be replaced with a new tooth or crown without the necessity of removing the bridge from the mouth.

A further object of our invention is to provide a construction in which the direction of greatest strength of the bridge is substantially in the plane of the greatest stress or force impressed upon the bridge during mastication whereby the practical strength of the bridge is materially enhanced.

It is also an object of our invention to so construct the teeth that the strain thereon is in substantial alinement with the direction of greatest length thereof where it is the strongest and to secure the teeth to the bridge in such relation thereto that the thinner portions thereof which are subjected to pressure and strain are supported immediately by portions of the bridge.

A still further object of our invention is to secure the teeth upon the bridge in such relation to the latter that the bridge is not visible except upon the lingual side. And it is also an object of our invention to provide a construction in which the interior surface of the structure is smooth, substantially straight and without the presence of shoulders or crevices of any kind or character.

Another object of our invention is to divide and balance the stresses upon the inner

portion of the crown of the tooth so as to remove these stresses from the outer portion of the tooth and support them fully upon the bridge or tooth backing.

Another object of our invention is to form facing wedge shaped surfaces of the bridge or tooth backing and a suitable ledge, at different acute angles to the direction of strain upon the tooth crown, and to rest the inner portion of the tooth crown upon the wedge shaped recess thus formed.

Another object of our invention is to construct a bridge support of general band form with the greatest width of the band extended nearly the length of the tooth, sloping enough to form an effective support to the teeth yet nearly enough in line with the direction of pressure upon the tooth crown to obtain the advantage of pressure nearly in line with the width of the band.

Other objects and advantages of our invention will be referred to hereinafter in the detailed portion of the specification or will be apparent therefrom.

In the accompanying drawing we have illustrated convenient embodiments of our invention which have proved practical, inexpensive and generally desirable, but it will be understood that changes in the details of construction may be made within the scope of the claims without departing from our said invention.

In the drawings:—Figure 1 is an elevation of the inside surface of a bridge having teeth secured and supported thereon and embodying our invention; Fig. 2 is a transverse section thereof on the line 2—2 of Fig. 1; Fig. 3 is an inside view of a tooth constructed in accordance with our invention; and Fig. 4 is a transverse section corresponding to that shown in Fig. 2 but showing a modified construction.

In the forms which we have illustrated, the bridge 1 is provided at one end with an anchoring pin 2 which is secured or anchored to a natural tooth in any known manner; that is to say, the pin 2 is connected to the base portion (not shown) of a cup-like part 3 in which is seated an artificial tooth 4. The lower end of such part is hollow and is adapted to fit over the upper end of a natural tooth which is prepared to be seated therein. The pin, the cup-like part and the natural tooth are secured firmly and close together by any suitable dental cement. The opposite end of

the bridge is provided with a cap 5 which may be fitted over a tooth and securely anchored thereto by dental cement. Either end or both ends of the bridge may be provided with any other equivalent known means for anchoring and supporting the same in position in the mouth. The bridge is provided with portions 6 corresponding to the points at which the artificial teeth are to be located which in cross section are of plano-convex shape. The lower ends of the portions 6 project below the main body portion of the bridge and are separated from each other and from the anchoring or supporting means at its opposite ends as shown at 7 in Fig. 1 of the drawing. In proportion to its width the bridge is relatively very thin, as is shown in Fig. 2 of the drawings. It will be observed by reference to Fig. 2 that the bridge in the direction of its width is located and extends in a plane inclined inwardly or lingually from the vertical plane of the posterior teeth, that is, the bicusps and the molars. The direction of the principal stresses and strains upon the bridge during mastication is substantially in the direction of the plane of its width, since it approximates a band and is nearly enough in the plane of the strains due to mastication to have great stiffness. The result is that although a bridge may be constructed relatively very thin it has the requisite strength for all practical purposes. This is an important consideration because it enables a manufacturer to construct a satisfactory bridge with a minimum amount of metal which metal usually is gold or some other very expensive substance.

The convex sides of the portions 6 are provided with relatively wide, low projections or bosses 8 which form ledges 8' and which have convex surfaces as shown at 9. These projections or bosses may be of any desired shape or contour. From these bosses or projections 8 pins 10 project. The ledge 8' forms a wedge shaped surface sloping oppositely to the outer surface of the bridge or tooth support and these two oppositely sloping faces balance the strains due to mastication upon the inner edge of the crown and prevent transmission of these strains to the outer part of the tooth. One purpose of the bosses or projections 9 and the pins 10 is to provide a satisfactory means for anchoring, securing and supporting the artificial teeth upon the bridge or support.

The teeth 15 embodying our invention are provided respectively upon their lingual sides with concavities 16 which are formed to fit snugly and closely the convex surfaces of the portions 6 of the bridge 1. Near the central portions of the respective concavities 16 we form a shallow depression 17 the bottom of which is of the same curvature as

that of the surface 9 of the boss or projection 8 and we also provide the respective teeth with holes 18 for the reception of the pins 10. It will be understood that the shape of the shallow depressions or cavities 17 is the same as that of the bosses or projections 8.

Preferably, and as illustrated, the pins 8 extend substantially at right angles to the curved surfaces of the portions 7 and the bosses or projections 8. That is to say, the said pins are extended in an outward or a buccal direction and are inclined upwardly at a small angle to a horizontal plane through the bridge.

It will be observed upon inspection of Fig. 2 that the upper edge of the bridge terminates or is located a short distance below the top or crown of the tooth and that the inside or lingual surface of the tooth is flush with the adjoining surface of the upper lingual side of the tooth. It will also be observed that the lower projecting ends of the portions 6 terminate at points very near the lower ends of the teeth 15 and that the adjacent inside lingual surfaces of the latter are flush with the lingual surface of the said portions 6. By this arrangement we secure a tooth as well as a dental bridge structure in which the surfaces are smooth and are entirely free from projecting parts forming shoulders and are also entirely free from crevices in which food may lodge and, remaining in the mouth, become very offensive and objectionable. In other words, our invention provides a construction which may be readily cleansed by washing, which is a most desirable feature of dental bridge construction. It will also be observed, upon reference particularly to Fig. 2 of the drawing, that the metallic part of the bridge proper is entirely concealed and hidden from view by the over-lying teeth 15 and the teeth are so supported that the vertical stresses thereon due to the force employed during mastication of food are in directions extending substantially in the direction of the length of the teeth. It will also be observed that the inside upper portions of the teeth, which are relatively thin, are supported directly and immediately by the upper curved portion of the bridge and the ledge and also that the shoulders or ledges formed between the body of the bridge and the bosses or projections 8 are strong enough to form most effective abutments to resist the strains and stresses to which the respective teeth may be subjected.

The bridge and the pins connected thereto may be formed integrally by casting or otherwise, or the bridge proper may be formed separately and the bosses or projections 8 and the pins 10 secured thereto by soldering. In Figs. 1 and 2 we have illustrated the bridge and the bosses or projections 8 and the pins 10 as being cast inte-

grally with each other. In Fig. 4, however, the bridge 20 is formed separately from the boss 21 and the pin 22 and the said boss and pin are shown as consisting of different material from the bridge proper. From an economical point of view the latter construction may be preferable because it permits the use of a base metal for the boss and the pin. Base metal may be employed for these parts for the reason that they do not at any time come into contact with the saliva and acid secretions which are or may be present in the mouth. In both forms of construction the teeth are placed in position upon the bridge over the pins and bosses or projections, as illustrated in Figs. 2 and 4, and are firmly secured thereto by means of any suitable dental cement, as indicated at 23.

In case a tooth should be accidentally or otherwise broken, it is apparent that it may be replaced by a new tooth without interfering with adjoining teeth and without removal of the bridge from the mouth.

A tooth constructed to embody our invention, one form of which is illustrated in the drawings, is well adapted for crown work for the repair of a natural tooth, for the reason that when such a tooth is employed its support is upon the lingual side of the tooth and therefore invisible from the exterior of the mouth. By reason of this fact the completed structure presents a particularly neat appearance.

Having thus described our invention, we claim:—

1. In a dental bridge structure, the combination of a bridge having portions provided with convex surfaces upon their buccal sides and having bosses formed upon the said surfaces and pins projecting from said bosses with teeth having depressions formed upon the lingual sides thereof which fit snugly the said convex surfaces and the said teeth having cavities therein for the reception of the said bosses and pins upon the said convex surfaces.

2. In a dental bridge structure, the combination of a bridge with teeth secured to

the buccal side thereof, the said teeth respectively being provided with concavities with continuous and uniform curvature upon their lingual sides which fit snugly and closely the buccal side of said bridge, and the portions of the lingual surface of the said bridge with which the said teeth are in contact being flush with the adjacent lingual surfaces of the said teeth and of a length approximately the height of the said teeth.

3. In a device of the character stated, a support forming the major lingual facing of the tooth and upon its outer surface forming an acute angle to the line of direction of pressure upon the tooth, a ledge projecting from the support whose surface forms an acute angle with the line of direction of pressure upon the tooth crown the two surfaces forming a wedge shaped space between them, in combination with a porcelain facing having its inner crown portion seated within this wedge shaped space.

4. In a device of the character described, a lingual facing for a tooth forming a support therefor, which facing is provided with an outward projection forming a ledge and with a pin extending outwardly from said projection, all in combination with a tooth mounted on said facing by means of said projection and pin.

5. An artificial tooth having a depression formed upon its lingual side which depression extends from a point adjacent to the inner edge of the cusp of the tooth to a point adjacent to the lower end of the said tooth and the said tooth being provided with a cavity which extends outwardly and at an acute angle to a line substantially normal to the cusp surface of the tooth.

In testimony that we claim the foregoing as our invention, we have hereunto signed our names this 18th day of December, A. D. 1911.

GEORGE L. WERNET.
HENRY A. COLLETT.

In the presence of—

GEO. H. WEIDNER,
CYRUS N. ANDERSON.