(No Model.)

C. P. GROUT.

DENTAL BRIDGE.

No. 347,934. Patented Aug. 24, 1886.

Fig 1.

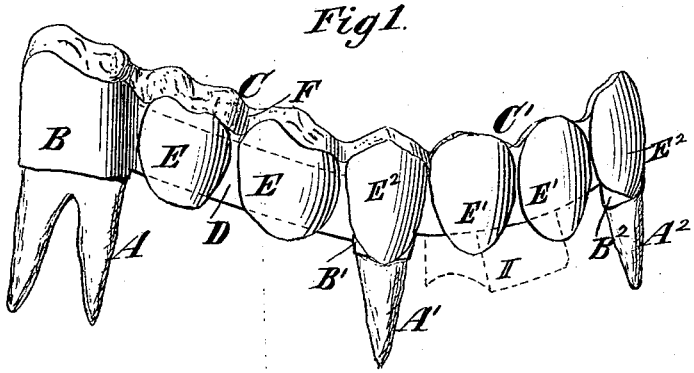


Fig 2.

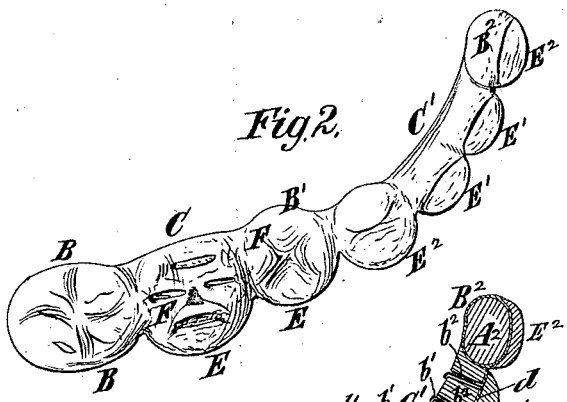


Fig 3.

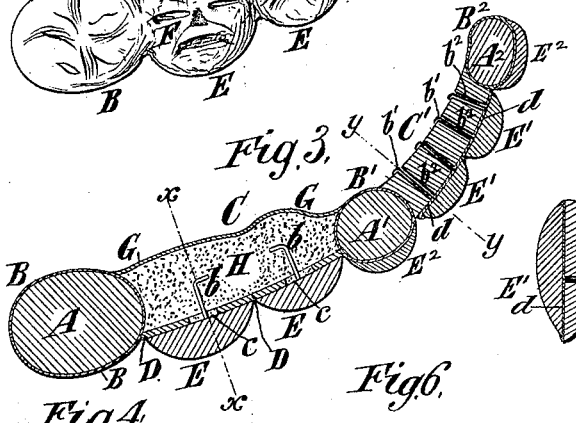


Fig 5.

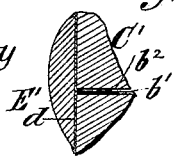


Fig 4.

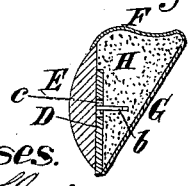
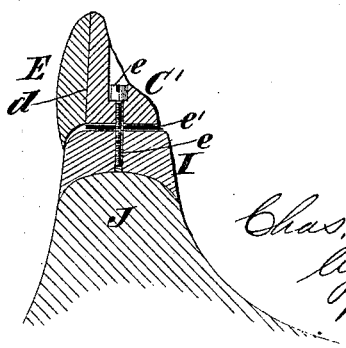


Fig 6.



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UNITED STATES PATENT OFFICE.

CHARLES P. GROUT, OF NEW YORK, N. Y.

DENTAL BRIDGE.

SPECIFICATION forming part of Letters Patent No. 347,934, dated August 24, 1886.

Application filed June 9, 1886. Serial No. 204,561. (No model.)

To all whom it may concern:

Be it known that I, CHARLES P. GROUT, of the city and county of New York, in the State of New York, have invented a new and useful Improvement in Dental Bridges, of which the following is a specification.

My invention relates to what are commonly known in the profession as "bridges," and which are supported by and comprise caps or crowns to fit over tooth roots or stumps at opposite ends of the space to be bridged over, and have secured to their fronts dummy teeth of porcelain to simulate the teeth which are missing.

The object of my invention is to provide a bridge which, although strong and serviceable, may be made at small cost, so that it may be supplied at less expense, and also to provide for readily securing the porcelain dummy teeth to the bridge without the application of heat directly to the porcelain, as is usual where the porcelain teeth have a metal backing soldered to their pins.

A further object of the invention is to provide for the support of the bridge upon the gum at a point between its ends or at its end, and to provide for the adjustment of such support in case of the shrinking away of the gum after the bridge is applied.

The invention consists in novel features in the construction of the bridge and in the novel combination of its component parts, including the means employed for combining the porcelain teeth or dummies with the bridge, all as hereinafter described, and pointed out in the claims.

The invention also consists in the combination, with a dental bridge, of a rest or support whereby the bridge may be supported upon the gum, and which is secured upon and adjustable upward and downward relatively to the bridge, in order to bring it to a proper bearing on the gum.

In the accompanying drawings, Figure 1 represents a view, partly in perspective, of an artificial denture embodying my invention, and comprising three tooth-crowns secured upon tooth roots or stumps and two bridge portions extending across the space between the crowns. Fig. 2 represents a plan of such denture. Fig. 3 represents a sectional view thereof in a horizontal plane. Fig. 4 represents a vertical transverse section on the plane of the dotted line *x x*, Fig. 3. Fig. 5 represents a corresponding section on the plane of the dotted line *y y*, Fig. 3; and Fig. 6 represents a similar transverse section, including also a rest or support which bears upon the gum and is adjustably connected with the bridge.

Similar letters of reference designate corresponding parts in all the figures.

A A′ A^2 designate, respectively, three tooth roots or stumps, upon which are secured metal caps or crowns B B′ B^2. The spaces between the several roots or stumps A A′ A^2 are bridged over by bridge portions C C′.

I will first describe the bridge portion C, which may be employed to connect the molar and bicuspid teeth; and in this example of the invention A designates the second molar and A′ designates the first bicuspid. The crowns B B′ are connected near the front and below their tops by a horizontal bar, D, which may have considerable depth and but little thickness, as shown in Fig. 4, and at the ends may be soldered to crowns B B′. At the front of this bar D are secured dummy porcelain teeth E, which have at their backs pins *b*, projecting inward through openings or slots *c*, formed in the bar D, and secured upon the bar in a manner soon to be described.

The top of the entire bridge portion C may be formed by a plate, F, of metal, which constitutes the occluding-surface for the opposite teeth. This plate F may be of a length to cover the whole bridge portion C, including the crowns B B′, and it is not necessary, therefore, that said crowns should have closed tops, as is usual. The crowns individually may have simply an inwardly-turned flange at the top, over which lies the top plate, F, and by making the crowns without closed tops the expense is reduced. The plate F should have in it the dents or cups which are necessary to form an occluding or grinding surface. The plate may be of comparatively thick metal and struck up by a die; or I may make it of thin metal and burnish it down to a hard-wax mold taken from the occluding teeth. The plate F should come to the upper edges of the dummies E, and form a neat finish and close fit thereto. The bridge may also comprise a back plate or portion, G, which may be sol-

dered at the ends to crowns B B′, and may or may not be soldered at the upper and lower edges to the top plate, F, and the bar D; but this back plate may be omitted, if desired.

The parts described form a skeleton structure, or what may be called a "frame-work," and the bridge is completed by a filling, H, of oxyphosphate of zinc, vulcanizable gum, solder, or other suitable material, which, when introduced, enters and fills all interstices and forms a solid and durable structure, the filling serving to bind the several parts together. The filling H also serves to secure the porcelain teeth E in place without the usual steps of soldering metal backing to the pins of the teeth and soldering the backed teeth to the bridge. The pins *b* have their inner ends hooked, upset, or otherwise formed so as to give them a retaining hold in the substance in which they are embedded, and said pins are of a length to extend inward from the bar D sufficiently to have a hold in the filling H when the latter is introduced. The porcelain teeth E may, if desired, be backed with metal, but in such case the backing will simply receive the pins *b* through it without being soldered to them, and the edge of the backing metal will be turned or burnished over the edge of the porcelain tooth, so as to make a neat finish.

The bridge above described, although strong and serviceable, is not expensive, and may be made and applied at a price which will bring dental bridge-work within the reach of persons of moderate means.

I will now describe the bridge portion C′, which extends between the first bicuspid A′ and the central incisor, A^2. This bridge portion, which is very much smaller in transverse section, it being both of less depth and of less width than the bridge portion C, is represented as made solid, of metal, as is usual. E′ designates porcelain teeth or dummies, which simulate the lateral incisor and canine teeth. These porcelain dummies E′ are provided with long pins *b′*, which extend through the bridge portion C from front to back, and are clinched or upset at their back ends to hold the teeth in place.

In the ordinary way of preparing the porcelain dummies and securing them to the bridge portion C′, as heretofore practiced, the metal pins at the back of the teeth would pass through the backing and be turned over, and the backed teeth would then be incorporated with or into the bridge by soldering. In order to avoid subjecting the porcelain teeth to the heat sufficient to solder, I make the pins *b* long enough to extend entirely through the bridge portion C′. It would, however, be extremely difficult to drill through the bridge portion C′ to form holes for receiving the pins, so accurately placed as to avoid straining the hold which the pins have in the teeth when inserting the pins through such holes; and to avoid this difficulty I form the holes for the reception of the pins *b′* by small tubes b^2, which extend through the middle of the bridge portion C′ from the front to back, and which receive through them the pins b^2.

In making the bridge portion C′ and providing for the attachment of the porcelain teeth E′, I proceed as follows: The pins *b′* of the teeth are left long, and a metal backing-plate, having holes to receive the pins, is slipped over them and burnished down against the surface of the tooth. I then slip the tubes b^2 over the pins and wax the pins, backing, tubes, and teeth in position relatively to the adjoining crowns which are to support them. The teeth and pins are then removed, and thin back leads or other temporary supports are passed through the tubes to hold them in place during subsequent soldering, and the whole is then invested and the solder run in to form the complete bridge portion. The leads are then removed from the tube and the teeth placed again in position, they being secured by turning over or upsetting the ends of the pins at the back of the bridge, or by a little cement placed in the tubes. The tubes b^2, which receive the pins *b′*, being located by the pins, the holes formed by said tubes are in exactly the proper position, and hence when the pins are inserted in place their hold in the porcelain teeth will not be strained.

I may dispense with the tubes b^2, and after the backing is waxed in position and the tooth withdrawn, I may place the back leads in the holes in the backing and the impressions which the pins leave in the wax, and flow the metal around them. The leads might be wrapped in metal foil to facilitate the flowing of the metal around them. The means employed to hold in place the porcelain teeth or dummies E and the similar teeth or dummies, E′, are not used alternately, the means for holding the teeth E in place being employed in connection with the hollow or skeleton bridge containing the filling in which the pins *b′* have a hold, and the crowns and small tubes b^2 being employed where a solid metal bridge is used.

In Fig. 6 I have shown a rest or support, I, which is secured and adjustable relatively to the bridge portion C′, and which bears upon the gum J, thereby giving the bridge portion C′ a proper support on the gum between the two crowns B′ B^2. The gum may shrink away after the bridge is applied in the mouth, and hence if the rest I were rigidly and non-adjustably secured to the bridge portion C′ it would lose its function after the gum had shrunk slightly away from it. To avoid this I connect the rest or support I with the bridge portion C′ by one or more screws, *e*, which provide for the introduction of packing *e′* between the bridge portion C′ and the support or rest I, as shown in Fig. 6. If, after such a bridge and support have been placed in position in the mouth, it is found that the gum shrinks away so as not to properly sustain the support or rest I, the screws *e* may be loosened, and one or more pieces of packing, *e′*, or a little cement may be introduced between the

bridge portion C' and the rest or support I, after which the screws *e* may be tightened, to firmly hold the support or rest in rigid relation to the bridge portion C'. The adjustable support or rest may be used at the ends of bridges and also at the front between canine teeth where the arch of the teeth at the front is very bowing.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a dental bridge, the combination, with tooth-crowns, of a front bar extending horizontally between them, a top plate forming the occluding-surface and extending between and secured to the crowns, and a filling introduced behind the front bar and below the top plate and uniting them in a solid structure, substantially as herein described.

2. In a dental bridge, the combination, with tooth-crowns, of a front bar extending horizontally between them, a top plate forming the occluding-surface and extending between and also over the crowns and secured to the tops of the crowns, and a filling introduced behind the front bar and under the top plate and uniting them in one solid structure, substantially as herein described.

3. In a dental bridge, the combination, with tooth-crowns, of a front bar, D, extending horizontally between them, a top plate, F, forming an occluding-surface, and a back plate, G, and a filling introduced within the skeleton structure or frame formed by the three said parts D F G, and serving to bind them together, substantially as herein described.

4. In a dental bridge, the combination, with tooth-crowns, of a skeleton structure or frame extending between the crowns and having openings in its front, porcelain teeth having pins which project rearward through said openings, and a filling introduced within the skeleton structure or frame and serving as a holding-ground for said pins, substantially as herein described.

5. The combination, with a dental bridge having holes which are cast in the metal and which extend transversely from front to back of the bridge, of a porcelain tooth having at the back pins which extend into and are secured in said holes, substantially as herein described.

6. The combination, with a dental bridge, of tubes extending through the bridge from front to back and incorporated rigidly in the bridge, and a porcelain tooth having at the back pins which extend into and are secured in the tubes, substantially as herein described.

7. The combination, with a dental bridge, of a rest whereby the bridge may be supported upon the gum, and which is secured upon and adjustable upward and downward relatively to the bridge, in order to bring it to a proper bearing on the gum, substantially as herein described.

CHAS. P. GROUT.

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