

(No Model.)

J. E. LOW.
ARTIFICIAL TOOTH CROWN.

No. 376,603.

Patented Jan. 17, 1888.

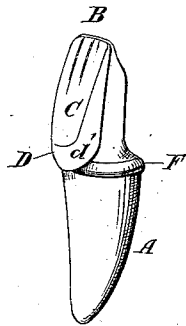


Fig. 1

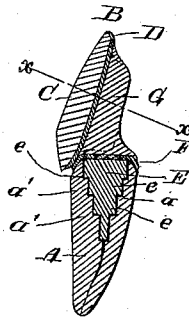


Fig. 2

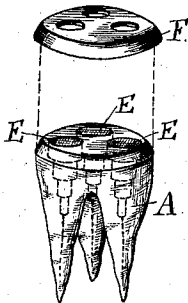


Fig. 10.

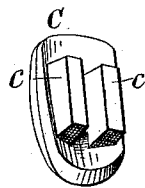


Fig. 3

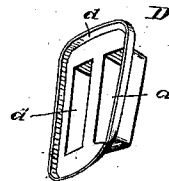


Fig. 4

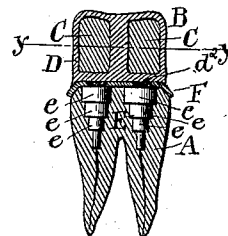


Fig. 8.



Fig. 5

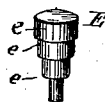


Fig. 6

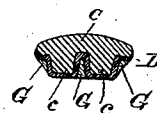


Fig. 7

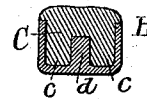


Fig. 9.

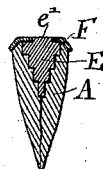


Fig. 11.

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ARTIFICIAL TOOTH-CROWN.

SPECIFICATION forming part of Letters Patent No. 376,603, dated January 17, 1888.

Application filed February 12, 1885. Renewed April 15, 1887. Serial No. 234,932. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. LOW, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Artificial Tooth-Crowns; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The object of this invention is to provide an improved construction in artificial tooth-crowns and in means for attaching such crowns to or supporting them upon stumps or roots of natural teeth; and it consists in the matters hereinafter described, and pointed out in the claims.

As it relates to an improved construction in the crown, the invention consists in a crown composed of a porcelain body or veneer and a metal part or base which is attached to the root, the said porcelain body or veneer and metal part or base being provided with interlocking recesses and projections, whereby the parts may be firmly and securely united by cement. This feature of construction is broadly covered in another application, Serial No. 137,831, for an improvement in artificial dentures, filed by me July 16, 1884, and is claimed herein only as applied in the construction of artificial crowns. The use of the form of crown herein shown is especially advantageous, in connection with the device herein shown, for attaching crowns to natural roots, as will hereinafter appear, and the said crown is therefore claimed herein also in connection with the said attaching device.

As it relates to means for attaching artificial crowns to natural roots, the invention consists, generally, in the combination, with an artificial crown, of a metal plug or plugs fitted to a socket or sockets in the root and secured in said socket or sockets by cement and soldered to a metal part of the crown, it usually being preferred to provide a plug for each prong of the root when the latter has two or more prongs. In carrying out this part of the invention the plug is made larger at its upper or outer than at its inner or lower end, and is also stepped or shouldered at its sides, whereby the plug is made more rigid at its outer end, a broad surface is afforded at such

outer end for the attachment of the crown, and a relatively large area of cemented surfaces for uniting the plug and tooth is afforded. In connection with the plug or plugs a metal cap is preferably used, said cap being attached to the plug and fitted over the upper end of the root. As shown in the accompanying drawings, the cap is made separate from the plug and secured to the latter and to the artificial crown by solder, and both the cap and the plug secured to the tooth by cement. The said cap, when made separate from the plug, is desirably but not necessarily provided with an aperture or apertures corresponding in position with the plug or plugs, the object of said aperture or apertures being to enable the cap, plug or plugs, and crown to be secured together at one soldering, as will hereinafter appear.

The invention may be more fully understood by reference to the accompanying drawings, in which—

Figure 1 is a perspective view of the artificial crown applied to a stump or root. Fig. 2 is a vertical section thereof. Fig. 3 is a perspective view of the rear side of a metallic base or socket for the porcelain body or veneer of the artificial crown. Fig. 4 is a perspective view of the front side of said base or socket. Fig. 5 is a perspective view of the metal cap shown in Fig. 2. Fig. 6 is a perspective view of the metal plug. Fig. 7 is a transverse section of the porcelain body or veneer and the metal base or socket therefor, taken upon line *xx* of Fig. 2. Fig. 8 is a sectional view of a two-pronged root provided with two plugs. Fig. 9 is a sectional view of the artificial crown shown in Fig. 8, taken upon line *xx* of said figure. Fig. 10 is a perspective view illustrating a three-pronged root provided with three plugs and a cap therefor. Fig. 11 is a sectional view of a root provided with a plug and cap, the plug having a projection fitting the aperture in the cap.

A refers to the stump or root of a natural tooth, and B indicates, as a whole, an artificial crown, which is shown in the drawings as composed of a porcelain body or veneer, C, and a metal backing, base, or socket, D, to which the porcelain part is secured by cement, the said porcelain part and metal backing being provided with interlocking recesses and

projections, as *c* and *d*, which are accurately fitted to each other, whereby the said parts may be firmly secured together by cement.

5 *E* is a metal plug, which is accurately fitted in and secured by cement to the walls of a socket, *a*, bored or drilled in the stump or root, and *F* is a metal cap which is attached to the plug, and which is saucer-shaped or provided with a conical marginal part or flange made to conform accurately to the adjacent rounded or beveled end or top surface of the root. In the drawings the cap is shown as made separate from the plug and provided with an aperture which is located over the 15 plug when the parts are in place, whereby the plug and the cap may be united to the tooth-crown by a body of solder passing through the said aperture, as hereinafter more fully set forth. When the cap is thus made, it is fitted to the root after the plug has been fitted in the socket of the root, the said plug, for convenience in fitting the parts, usually being cut or ground down at its top end flush with the top of the root, which latter is likewise preferably cut or ground down level with the plug and beveled about its margin.

The metal base *D* is, as shown in Figs. 1, 2, 3, 4, and 7, made of thin or sheet metal and is indented to form two oblong sockets, *d*, in which correspondingly-shaped projections *c* on the rear side of the porcelain body *C* are received, said base *D* preferably being provided with a marginal flange, *d'*, which extends over or embraces the side edges of the said porcelain part *C*. In the crown for the double or back tooth (shown in Fig. 8) the crown is similarly composed of a porcelain part or veneer, *C*, and a metal socket, *D*, the latter being, as shown, preferably provided with a part or flange, *d'*, at the base of the crown, which forms a relatively large surface in contact with the cap *F* when the parts are secured together.

The socket *a* in the stump or root is made 15 somewhat larger at its upper than at its lower end, and has its diameter abruptly contracted at several points between its upper and lower ends, so as to form annular shoulders or steps *a'* at intervals along its sides.

50 The metal plug is likewise made larger at its upper or outer than at its lower or inner end, and has its diameter abruptly contracted at intervals, so as to form annular shoulders *e*, corresponding in shape and position with the steps in the socket, to which latter the plug is, in these and all other respects, made to accurately conform.

In the operation of fitting the plug to the root any suitable means may be used for making the socket in the root, a drill or reamer adapted to form an aperture of the exact size and shape of the plug preferably being used for this purpose.

65 The plug is larger, and consequently stronger or more rigid, at its upper or outer than at its lower or inner end, and a relatively large area of metal is at the same time afforded at

the upper end for the attachment of the cap *F* and other parts by solder. By this construction, also, the plug is better adapted to fill all roots, for the reason that the cavity of a decayed root is located at the upper or outer part of the root, and the upper or larger part of the plug is adapted to fill such cavity. A shouldered form of plug is also of advantage, 75 inasmuch as the shoulders tend to prevent the moisture and acids of the mouth from entering between the cemented surfaces of the plug and tooth, and thereby destroying the adhesion of the cement.

80 The shouldered or stepped conformation of both the plug and the socket provides, also, an extended bearing for the plug, whereby the union of the two by cement will be stronger and more durable, and the union or connection of the plug with the stump or root readily attained after the plug with the artificial crown soldered thereto has been placed in the socket.

An important advantage is obtained, also, 90 by beveling the edge or corner of the stump and fitting the marginal portion of the cap *F* to said beveled part of the tooth, as above described, for the reasons that the crown is thereby additionally held from lateral movement, and that the liability of the entrance of moisture to the joint between the plug and root is thereby much lessened. In the application of the plug and cap to a single root, as shown in Figs. 1 and 2, the upper end of the root may 100 be conveniently beveled by the use of a concave reamer provided with a central projection adapted to engage the plug-socket, whereby the reamer may be accurately centered and the beveled surface of the root made concentric with the said plug-socket. When the beveled surface is formed in this manner, the inner surface of the flange of the cap *F* may obviously be made to conform to the shape of the reamer, and said cap may thereby be fitted to the tooth with little difficulty. It is obvious, furthermore, that also the plug, instead of being ground down level with the root, may be provided upon its top surface with a central projection fitted to the aperture 115 *f* in the cap *F*, as indicated at *e'*, Fig. 11, whereby the plug and cap may be readily secured together in the proper relative position without the use of any special devices for holding them while being soldered. The use of 120 such projection *e'* is not, however, confined to a construction in which the root is provided with a beveled edge concentric with the plug-socket, for the reason that an apertured cap may be fitted to the projection upon the plug 125 and the edges of said cap then made to conform to the margins of the top of the root, either when said margins are irregularly beveled or unbeveled, with advantages in the subsequent operation of attaching the crown, 130 which will be hereinafter set forth.

In the use of the devices above described for securing a crown to a two-pronged root, as shown in Fig. 8, a socket is formed in each

prong and two plugs are inserted. In this case the plugs will usually be ground down flush with the top of the root and the cap F then fitted over the top of the plugs and the root, which latter will preferably be beveled at its top edge, as above described. In this case the use of plugs provided with projections e^2 , fitted to the apertures in the cap, will not usually be employed, for the reason that the distance between the plugs will seldom, if ever, be the same, and the exact determination of the distance apart of the apertures to correspond with the position of the plugs may be found somewhat difficult. The tooth-crown illustrated in Fig. 8, a section of which is shown in Fig. 9, is provided with interlocking recesses and projections, and is generally similar to the crowns shown in the prior application above referred to.

In Fig. 10 a three-pronged root is shown as fitted with three plugs and an apertured cap, F, of a form adapted for application to said root.

One convenient way of applying the artificial crown to the stump or root will be to first properly cut or grind down the latter and then bore or drill out the socket or sockets therein. The metal plug or plugs will next be fitted in the socket or sockets, after which the metal cap F will be fitted upon the stump and the top of the plug or plugs therein. A cast or model will next be made of the stump or root, the metal cap, and the adjacent portions of the jaw, and a reverse cast then made of the first cast or model, in which the metal cap and the plug or plugs removed from the stump or root will be properly placed, whereby a correct representation of the jaw with the base fitted on a stump or root in the jaw and the plug or plugs fitted in the stump or root is obtained. In the use of a plug with a flat top, or one which is ground down flush with the top of the root, the plug and the cap, either when the latter is or is not provided with an aperture, f , will during this operation be held in proper relative position by the use of hard wax or by other means well known to a person skilled in the art. When, however, the plug is provided with a projection, e^2 , fitted to an aperture, f , in the cap, as shown in Fig. 11, the said plug and cap will obviously be held by such projection in the proper relative position during the operation without other means for this purpose. The crown is now properly placed upon the metal base F and inclosed in a suitable investment, after which the plug or plugs, cap, and backing D are united by a body of solder, which, when the cap F is apertured, as shown, will flow between the surfaces of the said cap and the plug or plugs, and thereby enable the several parts to be firmly united by one body of solder and at one soldering. When a sheet-metal base, D—such as is shown in Figs. 1, 2, 3, and 4—is used, the solder will be so disposed as to fill the space between and around the projections formed by the depressions d ,

so that the body of solder will be flush with said projections, and thereby give a smooth and finished backing of solder in rear of the metal base.

The important advantage obtained by the use of the crown composed of a porcelain and metal part united by cement in connection with the devices for securing the crown to the root is, that the porcelain body or veneer after the crown has been properly arranged in position may be removed from the metal base while the several parts are being soldered together, and afterward secured permanently in place by cement.

I am aware that it has been proposed heretofore to secure a crown comprising a metal base and a porcelain body secured together by the usual dowel-pins to a natural root by forming a cylindric or shouldered projection upon the upper or outer end of the root and fitting the said projection to a socket in the metal base of the crown, the crown being secured to the root by cement. This construction is objectionable for the reason that it is not applicable to short roots, or to those which are much decayed, or decayed principally in the middle, where a cavity usually forms, it being obvious that the central part of the tooth or root must in such construction be depended upon principally to withstand lateral strain upon the crown. Such prior construction, also, is not applicable to back teeth, or those with more than one prong or root, for the reason that sufficient support will not be afforded to the crown by one projection formed upon the root, and it is seldom, if ever, practicable to form the two or more projections upon the same root.

I am also aware that artificial crowns have been supported by means of cylindric plugs of metal provided with flanged caps and secured to the root by cement. Such plugs fail to support the crowns on account of their lack of rigidity at their upper ends and of the relatively small area of contact with the root to resist lateral strain and to afford a sufficiently strong union by the use of cement. It is impracticable, also, to successfully employ plugs of this character when the tooth or root is much decayed in its top, for the reason that in such case the plug will not be sufficiently supported by the root against lateral movement at its upper end, at which point it is obviously subjected to the greatest strain. In the use of a plug formed as herein proposed the latter may in all cases be fitted in contact with the outer part of the root at its upper end, such outer part being the hardest and strongest part of the root and that which is the least liable to be decayed, and the said plug is thereby made capable of effectually resisting lateral strain, and means is at the same time provided for firmly securing the plug in place by cement.

In the use of small cylindric plugs with flanged caps, furthermore, the cap has been made flat with a cylindric flange, and the exterior substance of the tooth cut away about

the top of the root to form a groove or rabbet to receive said flange. The cutting away of the tooth substance to a cylindric form, as required by that form of cap, is highly disadvantageous, inasmuch as the hardest and strongest part of the root is thereby removed and its capability of rigidly sustaining the crown greatly diminished. In connection with the tapered plug made as herein described, therefore, I preferably employ a saucer-shaped or conical cap which is without any cylindric flange and fits by its under concaved surface against the upper end of the root, which end is beveled or rounded to correspond in shape with the under or inner surface of the flange. The shaping of the root end in this manner does not involve the removal of any considerable portion of the outer hard wall of the root, which is thus left intact and affords a strong support for the outer end of the plug. The employment of a cylindric flange on the cap as a means of affording lateral support to the crown when a small cylindric plug is used is also obviously inconvenient in the case of irregularly-shaped teeth, inasmuch as the fitting of the flange to such teeth requires that some parts of the teeth be cut away much more than others. In the use of a conical plug with a conical cap, however, the edge of the cap or flange may be conformed to the outer wall of the tooth, and a smooth finish thus obtained, however irregular in form the side walls of the tooth may be.

I claim as my invention—

1. An artificial tooth-crown consisting of a metal part or base adapted for attachment to the natural root and a porcelain body or veneer, said portion and body or veneer and the metal part being provided with closely-inter-fitting recesses and projections and secured together by cement, substantially as and for the purpose set forth.

2. In combination with a natural root, an artificial tooth-crown provided with a plug made larger at its outer than at its inner end and inserted in and accurately fitted to a correspondingly-shaped recess in the root, said plug being made without screw-threads or similar holding devices and secured in the said recess by cement, substantially as described.

3. An artificial tooth-crown provided with a plug, E, made larger at its outer than at its inner end, and stepped or shouldered, as shown, and adapted to fit a correspondingly-shaped recess in the root, substantially as and for the purpose set forth.

4. An artificial tooth-crown provided with a plug which is made larger at its outer than at its inner end, is accurately fitted to a correspondingly-shaped recess in the natural root, and is provided with a saucer-shaped cap or flange having its concavity on its under side fitted on the convex top of the root, said plug being without screw-threads or similar means of attachment and being secured in said recess by cement, substantially as described.

5. In combination with an artificial tooth-crown, a metal plug for attaching the crown to a natural root, said plug being larger at its upper than at its lower end and stepped and shouldered, as shown, and a cap fitted over the plug and root, said plug and cap being secured together and to the artificial crown by solder, substantially as described.

6. In combination with an artificial crown, a metal plug made larger at its outer than at its inner end and a metal cap provided with a conical flange and fitted over the top of the plug and root, said plug and cap being secured together and to the tooth-crown by solder, substantially as described.

7. In combination with an artificial tooth-crown, a plug for attaching said crown to a natural root, said plug being larger at its outer than at its inner end and fitted to a socket in the root, and an apertured cap covering the top of the root and the plug, said cap and plug being secured together and to the tooth-crown by solder, substantially as described.

8. The combination, with an artificial tooth-crown comprising a porcelain body or veneer and a metal base or socket, said porcelain body and metal base being provided with interlocking recesses and projections and secured together by cement, of a plug made larger at its outer than at its inner end and fitted to a socket in the natural root, and a cap fitted over the root and plug, said plug and cap being secured together and to the metal base or socket of the crown by solder, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

JAMES E. LOW.

Witnesses:

C. CLARENCE POOLE,
OLIVER E. PAGIN.