(No Model.)

# C. E. DIEHL.

## ARTIFICIAL TOOTH CROWN.

No. 387,774. Patented Aug. 14, 1888.

FIG. 1.

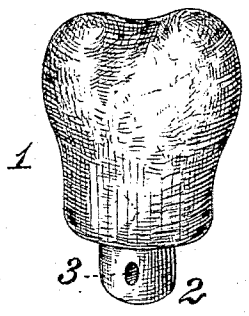



FIG. 2.

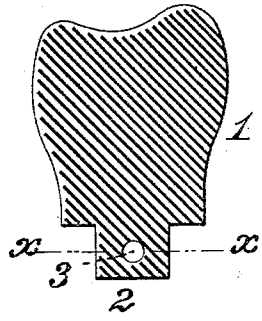



FIG. 3.

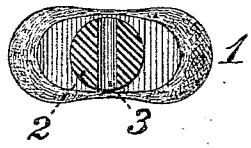



FIG. 4.

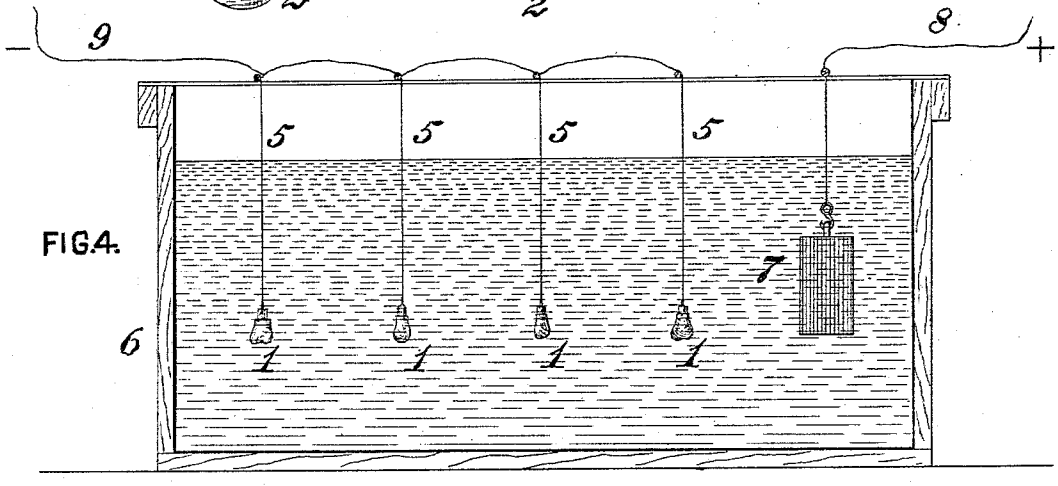



FIG. 5.

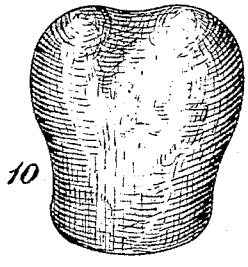



FIG. 6.

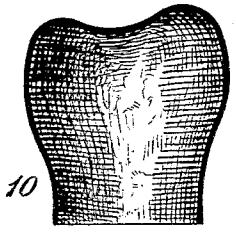



FIG. 7.

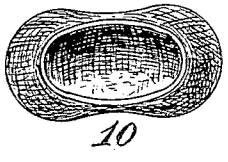
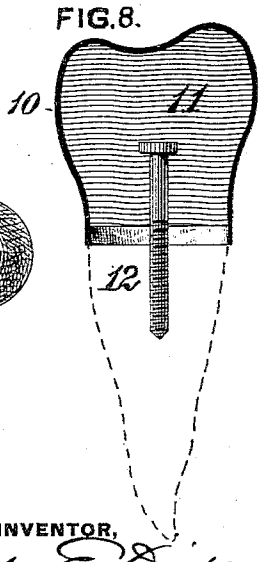



FIG. 8.




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# UNITED STATES PATENT OFFICE.

CHARLES E. DIEHL, OF PITTSBURG, PENNSYLVANIA.

## ARTIFICIAL TOOTH-CROWN.

SPECIFICATION forming part of Letters Patent No. 387,774, dated August 14, 1888.

Application filed February 1, 1888. Serial No. 262,653. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES E. DIEHL, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in the Manufacture of Tooth-Crowns, of which improvement the following is a specification.

The object of my invention is to furnish expeditiously and at comparatively slight cost metallic tooth-crowns for use in dentistry, which shall be integral and of unbroken contour, and shall correspond accurately in form and dimensions with the portions of the natural teeth which the crowns are designed to replace.

To this end my invention, generally stated, consists in a novel method of first forming a pattern of desired shape, then depositing thereon a metallic shell or casing by the action of an electric current, and finally removing either the whole or a portion of the inclosed pattern from the metallic shell.

The improvement claimed is hereinafter fully set forth.

My invention enables metallic tooth-crowns corresponding accurately to any required shape of tooth and of perfect exterior finish to be furnished with such reduction of time and cost as to effectually remove the objections which previously obtained to their use and to render them generally and desirably applicable in dental practice.

In the accompanying drawings, Figure 1 is a view in perspective, and on an enlarged scale, of a pattern employed in the formation of a tooth-crown in accordance with my invention; Fig. 2, a longitudinal central section through the same; Fig. 3, a transverse section at the line *x x* of Fig. 2; Fig. 4, a section through a tank or vat in which the deposition of the metal upon the pattern is effected; Fig. 5, a view in perspective of a finished tooth-crown; Fig. 6, a longitudinal section through the same; Fig. 7, an end view of the same, and Fig. 8 a longitudinal section illustrating the same fitted with means for attachment to the natural root to which it is to be applied.

In the practice of my invention I first form a pattern, 1, corresponding in shape with the natural tooth-crown which it is desired to replace with an artificial crown and having preferably a short longitudinal projection or extension, 2, adjoining its lower end, or that corresponding with the portion of a tooth next the root, said projection being designed for the attachment of a suspending-wire, which may be twisted around it or passed through an eye or transverse hole, 3. The pattern 1 may be made of any material which can be readily wrought into form and will retain its consistency under ordinary atmospheric temperatures and conditions, but is preferably composed of a metal or alloy which is readily fusible at a comparatively low temperature, an instance with which good results have been obtained in practice being an alloy of one part of tin, two parts of bismuth, and one part of lead. I next proceed to form by electro deposition a shell or casing of metal upon the pattern 1, for which purpose the pattern or any desired number of patterns are suspended by copper wires 5, connected to their projections 2, within a tank or vat, 6, containing an anode, 7, of the metal to be deposited and a solution suitable for the transmission of metal therefrom by the action of an electric current. The anode 7 and the suspending-wires 5 are then connected by conducting-wires 8 and 9 with the positive and the negative poles, respectively, of a voltaic battery or other suitable source of electricity, and an electric current is passed through them for a sufficient period to form by deposition a metallic shell or casing upon each of the patterns 1. I prefer in practice to form the base or inner portion of said shell of a thin coating of copper, and thereafter to place the pattern in another bath containing an anode of gold or a suitable compound thereof, and complete the shell by depositing upon the copper an outer coating of gold. The entire shell may, however, be composed of the latter metal, or of another metal—as platinum or silver—if preferred.

The patterns inclosed in the shells or casings thus formed upon them are taken out of the bath and the pattern is removed from the shell, either wholly, if its material is of such character as is not considered desirable as a filling for the tooth-crown, or to any partial degree that may be necessary to enable the crown to be properly fitted for attachment to a root, in

case the retention of a portion of the pattern within the casing should not be considered objectionable. The removal of the pattern may be effected by fusing, burning, drilling, or cutting, as may be found most convenient and desirable in accordance with the character of the material of which it is composed. The portion of the shell which incloses the projection 2 of the pattern and which projects beyond the desired line of connection to the root being then cut away, there remains an integral and seamless hollow metallic tooth-crown, 10, of the desired form and dimensions, which is in readiness to receive a suitable filling and to be attached to a natural root by a pin or screw in the manner known in the art. As shown in Fig. 8, the tooth-crown is provided with a filling, 11, which may be composed of any of the well-known zinc cements or of gutta-percha, and a screw, 12, to engage a cavity in the natural root, is inserted in the filling.

A metallic tooth-crown, as herein described and shown, constitutes the subject-matter of a separate application filed by me of even date herewith, and is not therefore claimed as of my invention herein.

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

The improvement in the manufacture of tooth-crowns, which consists in first forming a pattern presenting the contour of the crown portion of a natural tooth, then depositing thereon a shell or casing of metal by the action of an electric current, and finally removing the pattern from the inclosing-shell, substantially as set forth.

In testimony whereof I have hereunto set my hand.

CHARLES E. DIEHL.

Witnesses:
J. SNOWDEN BELL,
R. H. WHITTLESEY.