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DENTAL-CROWN-SWAGING DEVICE.

946,962.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM H. GRAHAM, a citizen of the Dominion of Canada, residing at Detroit, in the county of Wayne, State of Michigan, have invented certain new and useful Improvements in Dental-Crown-Swaging Devices; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to a dental crown swaging device, and consists in the construction and arrangement of parts hereinafter more fully set forth and pointed out particularly in the claims.

The primary object of the invention is to provide simple and efficient means for swaging a blank tooth crown in a previously formed matrix in a manner to cause it to partake of the configuration of the tooth to be crowned, the arrangement being such that the parts are held firmly together, the force from the blow in swaging concentrated upon the crown in the matrix and the liability of the separation of the parts under a blow obviated, preventing a misapplication of the swaging force and possible injury to the crown blank and matrix.

A further object is to provide efficient means for removing the matrix from the mold.

The above objects are attained by the structure illustrated in the accompanying drawings, in which:—

Figure 1 is an elevation of a dental crown swaging device involving my invention. Fig. 2 is a central longitudinal section there-through. Fig. 3 is a similar section showing the tooth crown swaged out to conform to the shape of the matrix. Fig. 4 is an elevation of the parts segregated. Fig. 5 is a sectional view showing the position of parts when molding the matrix around the tooth form or model. Fig. 6 is a similar view showing the position of parts when removing the matrix from the mold. Fig. 7 is a plan view of the mold. Fig. 8 is a plan view of a matrix. Fig. 9 is an elevation of the angular dividing plate employed in the mold to form a groove in the matrix when cast to enable the matrix to be divided.

Referring to the characters of reference, 1 designates a mold block which is preferably cylindrical in form having a conical aperture 2 extending axially thereof for the greater portion of its length, the conical bore of the mold terminating at the annular shoulder 3 from which point the remaining portion of the bore through the mold block is straight, as shown at 4. Within the opposite walls of the mold block are the opposed diametrical slits 5, and formed in the conical wall only of said block between said slits are the tapered grooves 6. Adapted to slip into the opposed slits in the mold is a thin, angular dividing plate 7 adapted to form a channel in the exterior wall of the matrix when said matrix is cast in the mold to enable the matrix to be divided on the line of said channel so as to render its parts separable for the purpose of enabling the ready removal of the swaged crown after it shall have been given the proper form within the matrix. Formed around the top of the mold block 1 is an annular shoulder 8 adapted to receive a corresponding annular recess in the bottom of the cap 9 adapted to fit over the upper end of the mold block, as shown in Figs. 2 and 3 and having the vertically extending hollow stem 10 for the guidance of the swaging plunger 11 whose circular end portion 12 is adapted to enter and snugly fill the circular opening 13, see Fig. 2, through the stem of said cap. The cap and mold are adapted to fit tightly together so as to securely confine within the mold cavity that with which it may be filled.

To provide for securely locking the mold block and cap together during the operation of swaging, there is employed an annular base 14 having a socket 15 therein adapted to receive the mold block and having a threaded flange 16 projecting from the upper edge thereof, the periphery of said base being provided with a knurled band 17. Adapted to screw onto the threaded flange 16 of the base is an internally threaded collar 18 having a central aperture therethrough that receives the stem of the cap 9 and having a rounded inner wall 19 adapted to fit snugly over the upper portion of said cap, whereby when said collar is screwed onto said base, the cap becomes firmly seated on the mold block and all parts are securely clamped together, as clearly shown in Fig. 2. Upon the exterior of the collar 18 is a knurled band 20 which together with the band 17

on the base, enables said parts to be firmly grasped with the hands for the purpose of turning said collar to screw it onto the base or unscrew it therefrom.

8 In the bottom portion of the base is a circular receptacle 21 in the wall of which is formed an annular shoulder 22. The annular shoulder 8 of the mold block when said block is inverted is adapted to lie within the
10 outer opening of the circular receptacle 21 in the under face of the base and to rest upon said shoulder 22, as clearly shown in Figs. 5 and 6 for the purpose of casting the
15 matrix around the tooth form or model or for removing the formed matrix from the mold.

In describing the manner of using this improved device I will commence with the method of forming the matrix which is as
20 follows:—Moldine, or other plastic material 23, is placed in the receptacle 21 and mounted in said plastic material so as to stand vertically is the tooth form or model 24 which has been previously fashioned in a suitable
25 manner after the shape of the teeth it is desired to crown. The mold block with the dividing plate 7 therein is then inverted over said model with the shoulder 8 thereof lying in the outer opening of the receptacle
30 21 and resting upon the shoulder 22. When the parts are so positioned metal fusible at a low temperature, such as lead, is poured in a molten state through the opening 4 so as to fill the mold chamber, said metal flow-
35 ing around the model 24 of the teeth and forming the matrix 25; the mold block is then lifted from the base and the matrix removed from the mold. The presence of the dividing plate 7 in the mold forms a channel
40 26 in the outer wall of the matrix when said plate is withdrawn of sufficient depth to enable the matrix to be split apart or divided by the insertion of a tool into said channel, thereby enabling the removal of the tooth
45 model therefrom, the impression of which remains in the metal of the matrix, as shown at 27, and forming a separable matrix that may be readily divided to remove the swaged crown. When the molten metal
50 from which the matrix is formed flows into the mold, it fills the grooves 6, thereby forming upon the matrix the projecting lugs 28 which when the matrix is reinserted in the mold block preparatory to swaging must be
55 made to register with said grooves, thereby insuring a perfect fit of the matrix within the mold block.

After the matrix shall have been formed and divided so as to render its parts separable, it is reinserted in the mold block with a
60 blank tooth crown therein, as shown in Fig. 2, the matrix filling the mold chamber and its lower end resting upon the shoulder 3 thereof to give it a firm bearing. The mold
65 block is then placed within the base 14, the

cap 9 placed upon the mold block with soft rubber or other pliable material 30 within the opening therethrough; the collar 18 is then screwed onto the base so as to clasp the
70 cap upon the mold block, thereby firmly locking the parts in position for swaging. The reduced end 12 of the plunger 11 is then inserted in the stem of the cap onto the pliable material therein and is driven down-
75 wardly by a mallet or other suitable means with sufficient force to crowd said rubber or pliable material into the blank tooth crown within the cavity of the matrix, causing said
80 crown to conform to the contour of said cavity, and thereby assume the shape of the tooth form or model. The comparative smallness of the plunger in transverse area causes the swaging blow to be delivered di-
85 rectly over the cavity in the matrix occupied by the tooth crown, thereby obviating a dissipation of said force and enabling such a concentration thereof as to readily force the crown into contact with the irregular wall of the cavity in the matrix. After the comple-
90 tion of the swaging operation, the plunger is withdrawn and the collar 18 unscrewed so as to permit of the removal of the mold block from which the matrix may be discharged without injury to the formed crown by in-
95 verting said block upon the inverted base as shown in Fig. 6 and striking lightly against the upper end of the matrix with the end of the plunger, as shown by dotted lines. As the matrix leaves the mold it drops apart, thereby freeing the seamless crown which is
100 then ready to be set in place.

While I have shown in Fig. 5 a method of molding from the tooth model to form a matrix, if desired the mold block may be filled with molten metal and the tooth form or
105 model dipped therein while in a molten state, as will be well understood in the art.

Having thus fully set forth my invention, what I claim as new and desire to secure by Letters Patent, is:—
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1. A device for the purpose set forth, consisting of a mold block, a base in which the mold block is seated, a cap removably mounted upon the mold block and having an aperture for the reception of a plunger and a
115 collar concentric to and embracing said cap, said collar being screwed onto the base to draw said cap forcibly onto the mold block.

2. A device for the purpose set forth, comprising a mold block, a base in which the
120 mold block is seated, a cap removably mounted on the mold block and having an opening for the insertion of a plunger, said cap and mold block having annular flanges forming concentric engaging members, and a cylin-
125 drical collar fitted over the cap and embracing said cap and a portion of the mold block, said collar having a threaded connection with the base to draw the cap forcibly onto the mold block.
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3. In a device for the purpose set forth, the combination of a mold block, a base in which said block is removably seated, a cap for the mold block having an opening for the insertion of a plunger, a collar embracing the cap, said base having a projecting threaded flange, and said collar being internally threaded to screw onto said flange to draw the collar onto the base and forcibly clamp the cap in position on the mold block.

4. A device for the purpose set forth, comprising a mold block, a base in which said block is removably seated, a cap for the mold block having a projecting guide stem, a collar mounted upon and embracing said cap said collar being apertured to freely receive said stem, and means for drawing the collar and base together to clamp said cap upon said mold block.

5. A device for the purpose set forth, comprising a mold block having a mold chamber

therein adapted to receive a matrix, a cap fitted over the mold block and having a hollow guide stem communicating with said mold chamber, a base in which the mold block is removably seated, a rotatable collar embracing said cap, said collar being threaded to said base, and a plunger adapted to enter the hollow stem of the cap.

6. In a device for the purpose set forth, the combination of a base having recesses therein, a reversible mold block adapted to be seated in said recesses, said mold block having a tapered mold chamber and a straight opening therethrough communicating with said tapered chamber.

In testimony whereof, I sign this specification in the presence of two witnesses.

WILLIAM H. GRAHAM.

Witnesses:

O. B. BAENZIGER,
I. G. HOWLETT.