F. O. JAQUES, Jr.

METHOD OF FORMING TOOTH CROWN MATRICES.

APPLICATION FILED OCT. 27, 1908.

934,536. Patented Sept. 21, 1909.

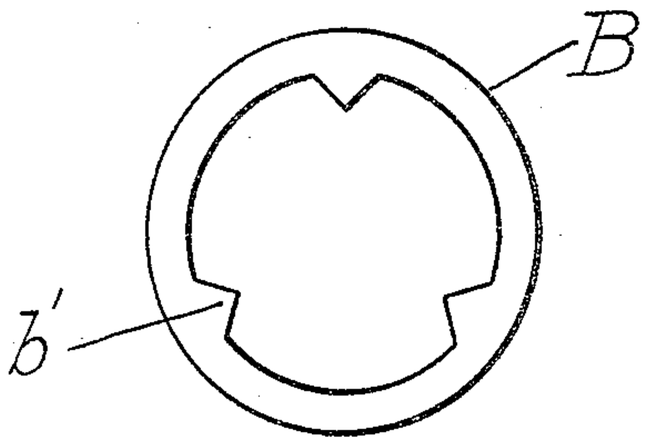

FIG. 1.

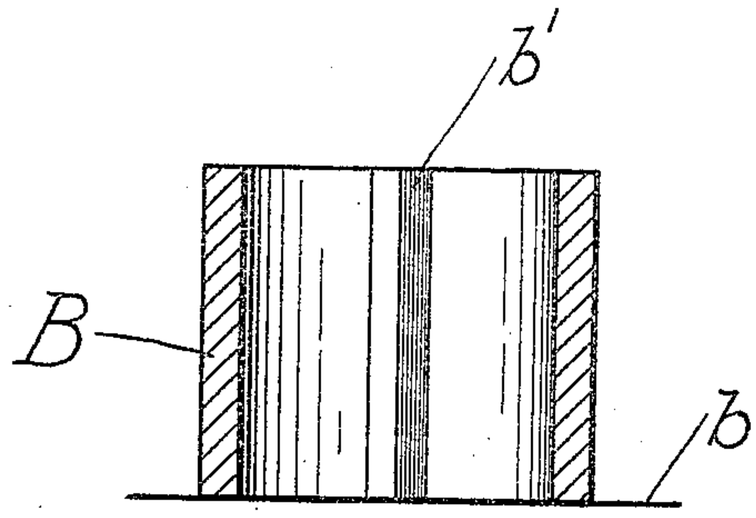

FIG. 2.

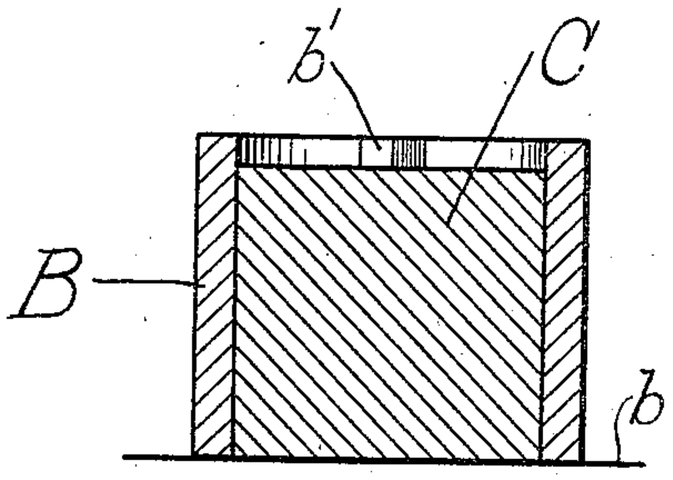

FIG. 3.

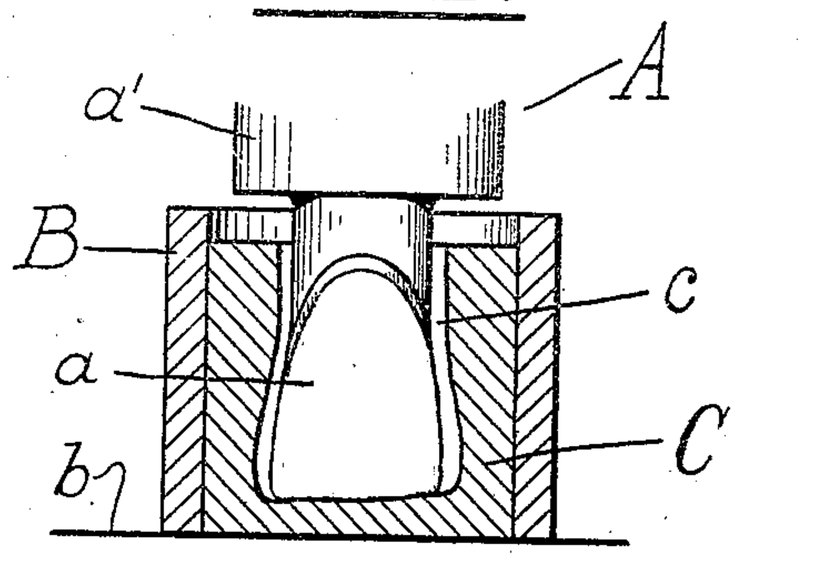

FIG. 4.

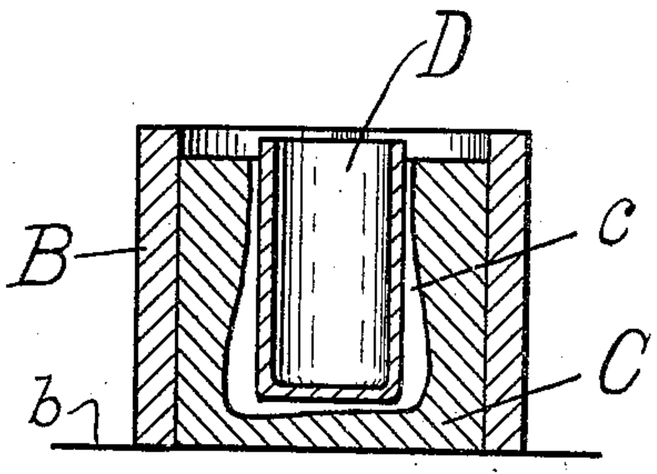

FIG. 5.

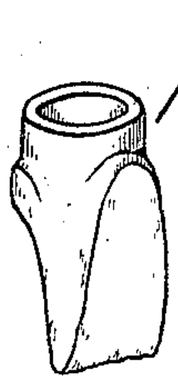

FIG. 7.

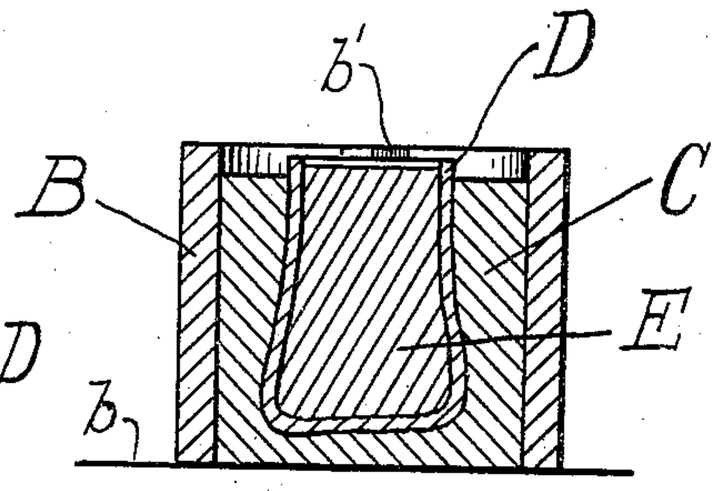

FIG. 6.

WITNESSES.

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METHOD OF FORMING TOOTH-CROWN MATRICES.

934,536. Specification of Letters Patent. **Patented Sept. 21, 1909.**

Application filed October 27, 1908. Serial No. 459,698.

To all whom it may concern:

Be it known that I, FERNANDO O. JAQUES, Jr., a citizen of the United States, residing at Cranston, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Methods of Forming Tooth-Crown Matrices, of which the following is a specification.

My invention relates to a method or process of shaping or contouring seamless metallic tooth crowns. Such crowns have commonly been formed and applied to the natural tooth by external swaging which involves an excessive number of steps and a crimping of the crown margin in affixing. Unsuccessful attempts have been made to overcome the above and other disadvantages by a process involving internal swaging, but such attempts resulted in inaccuracy of contouring, and defacement of the shell, which rendered the crown useless.

The objects of the present invention are to form the crown by employing a minimum of steps; to avoid defacing the exterior of the crown during the process; to insure an exact correspondence in the contour and dimensions of the crown interior with the shape and exterior dimensions of the natural tooth prior to application of the crown to the tooth; and to prevent the formation of blow holes or cavities in the recess of the matrix.

Other objects and advantages will be hereinafter pointed out, and the matter pertinent thereto be recited in the claims.

My invention consists in the steps and operations hereinafter set forth and pointed out in the claims.

In the accompanying drawings, which constitute a part of this specification, Figure 1 is a plan view of the flask, Fig. 2, a diametrical section of the same, Fig. 3, a like section of the flask and the liquid matrix therein, Fig. 4, a similar section of the same after the movement by the form, showing the form in side elevation, Fig. 5, a sectional view of the form, matrix and blank before the expanding step, Fig. 6, a like view of the same after the expanding step, and Fig. 7, the complete contoured crown.

Like characters of reference indicate like parts throughout the views.

My method of contouring is thus performed: A form, A, corresponding identically in all dimensions and in contour with the natural tooth, is formed from plaster of paris or other frangible material in any usual and convenient manner known to those versed in this art. This model as is usual comprises the form proper, *a*, and the base, *a'*. A tubular flask, B, is provided, preferably bottomless, which may rest upon any hard base, *b*. This flask may have vertical ribs, *b'*, upon its inner surface, but this is not essential. Any convenient fusible metal, but preferably a metal which is granular or frangible, is fused to a liquid condition and poured into the flask, as at C, in Fig. 3. While the metal is still liquid or plastic or before it has substantially hardened the portion, *a*, of the form is inserted into the soft metal where it is oscillated slightly during the cooling of the liquid whereby there is formed in the hardened metal, as shown in Fig. 4, an opening, *c*, of greater dimensions than that of the exterior surface of the form. This excess of dimensions over the size of the form represents the thickness of the wall of the crown which is later to be employed. Care should be exercised when the tooth form is manually oscillated that the movement be not excessive in a lateral direction, lest the contour of the model impressed in the metal be distorted. More minute accuracy is secured when the motion of the form is performed mechanically by some such mechanism as set forth in my copending patent application, Serial No. 459,699, filed October 27, 1908. After the metal, C, has cooled and hardened, it forms the matrix for further operations. When the shape of the form is disproportionately large at its lower portion, it is, instead of being withdrawn, fractured and dug out by any convenient instrument since its plaster body is easily fractured. A cylindrical crown blank, D, is next inserted into the contoured recess, *c*, of the matrix, C, as shown in Fig. 5, and filled or partly filled with filings, wood, rubber, or other compressible or soft material, E. This material is tamped or otherwise forced down into the blank, thereby forcing the wall of the blank outwardly against the cavity wall of the matrix whereby the contour of the recess is imparted to the blank, as shown in Fig. 6. The flask is then turned on its side and the matrix removed therefrom by a hammer or otherwise; and the frangible body of the matrix transversely split by the same means to release

the contoured blank. This splitting or fracturing of the matrix is facilitated by the vertical impression made in the matrix by the vertical ribs, *b*. These grooves, however, are not essential. The compressible material, E, is then removed from the blank, leaving the contoured blank or crown, D, as shown in Fig. 7. The upper portion of the crown, D, may be turned down at the top to any desired length preferred by the operator in the usual manner.

What I claim is,

1. The method of forming tooth crown matrices which consists in pouring a fusible metal into a receptacle, agitating a form of the natural tooth in the fused metal to form a recess of greater dimensions than the form, and permitting the fused metal to harden by cooling.

2. The method of forming tooth crown matrices which consists in pouring a fusible metal into a receptacle, and agitating a form of the natural tooth in the fused metal while the metal is cooling to form a recess therein of greater dimensions than the form.

3. The method of forming tooth crown matrices which consists in pouring a fusible metal into a receptacle, agitating a form of the natural tooth in the metal while the metal is in a plastic state to form a recess therein of greater dimensions than the tooth, and permitting the metal to cool to harden the matrix.

4. The method of forming tooth crown matrices which consists in pouring metal in a fused state into a receptacle, and agitating a form of the natural tooth in the fused metal while the metal is hardening sufficiently to form a recess in the hardened metal of sufficiently greater dimensions than the form as to compensate for the thickness of the crown intended to be applied thereto.

5. The method of forming tooth crown matrices which consists in pouring a frangible metal in a fused state into a receptacle, agitating a form of the natural tooth in the metal while the metal is cooling to form a recess of greater dimensions than the form, and permitting the fused metal to harden.

6. The method of forming tooth crown matrices which consists in introducing into a receptacle metal in a fused state, oscillating a model of the dimensions of the natural tooth in the metal while the metal is in a plastic state, and permitting the metal to harden to form a matrix.

7. The method of forming tooth crown matrices which consists in casting a metal forming a matrix around a tooth form while the tooth form is being agitated to form a recess in the matrix of greater dimensions than the tooth form.

In testimony whereof I have affixed my signature in presence of two witnesses.

FERNANDO O. JAQUES, Jr.

Witnesses:

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Walter Louis Frost.