

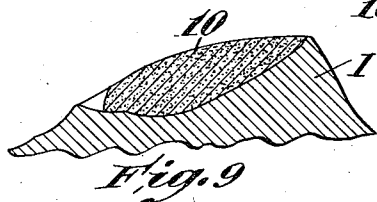
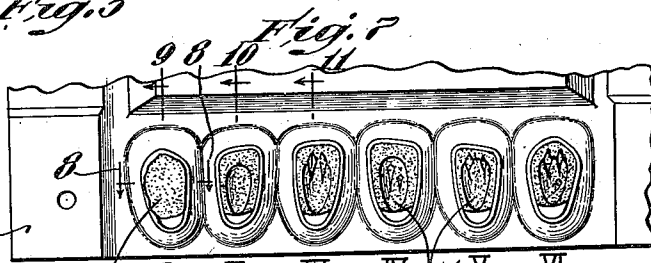
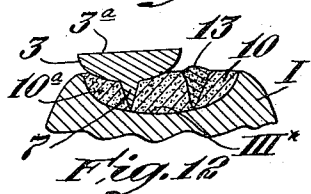
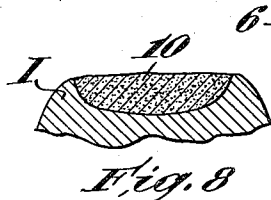
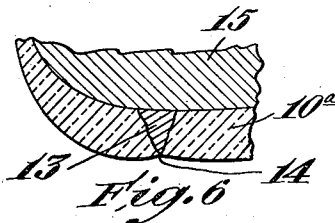
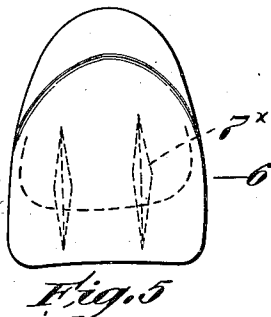
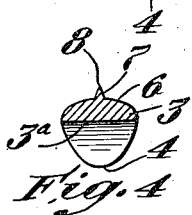
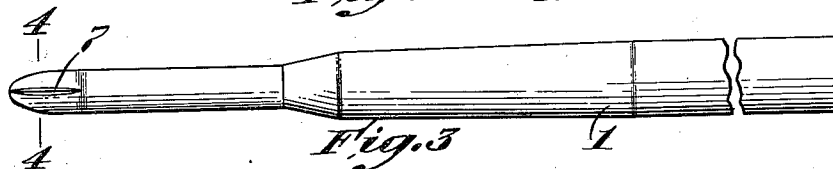
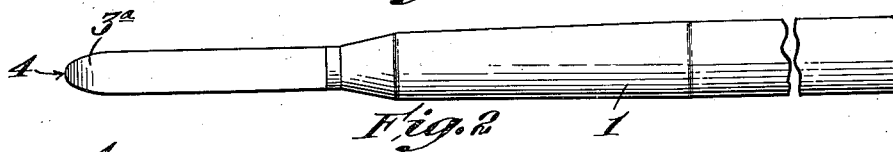
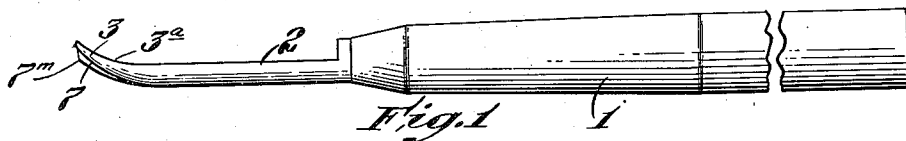
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2,245,291

BLENDING IMPLEMENT

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2,245,291

BLENDING IMPLEMENT

Simon Myerson, Brookline, Mass.

Application November 24, 1939, Serial No. 305,790

5 Claims. (Cl. 18—5.7)

This invention pertains to the manufacture of artificial teeth, and relates more particularly to a blending implement useful in making teeth of the kind which simulate natural teeth having stains resulting from the presence of minute cracks or narrow fissures in the enamel. Artificial teeth of this kind are disclosed in the copending application for Letters Patent Serial No. 130,725, filed by Simon Myerson December 20, 1937, and are conveniently prepared in accordance with the method more fully disclosed in the copending application for Letters Patent Serial No. 276,838, filed by Simon Myerson June 1, 1939, the present invention being of especial utility in the practice of such or similar methods.

In accordance with the method just referred to, the labial cavity of the tooth mould is first substantially filled with enamel, forming a slip. The exposed surface of the enamel, that is, the lingual surface, is then worked upon with the blending tool herein described to form the said enamel lying in the face of the mould to the form described, and also to the thickness desired at any particular location in the mould. With some of the modifications of my blending tool herein illustrated one can also determine the extent of the enamel cap at the incisal edge of the tooth, and while blending the enamel slip to the form and thickness desired my blending tool simultaneously forms fissures and grooves in the enamel. These fissures, grooves, indentations or cracks must be very narrow, preferably decreasing in transverse thickness toward the labial surface of the lining material, in other words, being more or less triangular in transverse section with the apex of the triangle located at or close to the labial surface of the enamel-forming slip. These cracks, fissures or indentations usually extend for a substantial distance longitudinally of the tooth. When these fissures are filled with material contrasting in appearance with the enamel, they produce the effects of stria or stains, or other natural tooth effects on the labial surface of the artificial tooth.

Since the method of making teeth set forth in application Serial No. 276,838 above referred to is intended for mass production, it is essential that every step in such method be capable of performance rapidly and without necessitating high skill on the part of the workers. With the usual blending tool it was not possible to form the enamel to any definite or predetermined thickness, nor to produce the fissures or grooves as described.

The principal object of the present invention

is to provide an implement by means of which a mass of enamel of any desired thickness may be formed and simultaneously provided with such narrow elongate indentations, grooves, fissures or cracks.

Referring to the drawing in which one desirable embodiment of the invention is illustrated by way of example,

Fig. 1 is a side elevation, to large scale, of the complete implement;

Fig. 2 is a fragmentary plan view of the implement of Fig. 1;

Fig. 3 is a bottom plan view of the implement of Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 3;

Fig. 5 is a front elevation, to larger scale, of a tooth having stain-simulating inserts made in accordance with a method in the practice of which the implement of the present invention is useful;

Fig. 6 is a section, to larger scale, on the line 6—6 of Fig. 5;

Fig. 7 is a fragmentary plan view of a tooth-moulding block illustrating the labial cavities in the block and several successive steps in the method of moulding teeth;

Fig. 8 is a transverse section, to large scale, on the line 8—8 of Fig. 7;

Fig. 9 is a section on the line 9—9 of Fig. 7;

Fig. 10 is a section, to large scale, on the line 10—10 of Fig. 7;

Fig. 11 is a section, to large scale, on the line 11—11 of Fig. 7;

Fig. 12 is a section, to large scale, showing the implement of the present invention in use; and

Figs. 13, 14 and 15 are fragmentary views illustrating blades of modified constructions.

As illustrated in Figs. 1, 2 and 3, the improved tooth-moulding tool or implement includes the handle portion 1 which may be of any suitable material, for instance wood, hard rubber, synthetic resin or the like, and the shank 2 which terminates in the blade or blending portion 3. The shank and blade, as here illustrated, are integral and are conveniently formed from a rod or bar of stainless steel or other appropriate metal or material, the shank being secured to the handle 1 in any approved manner. The blending blade or working portion 3 terminates at 4 in a smoothly rounded tip and has an upper surface 3^a (Fig. 1) which is substantially straight transversely but concave longitudinally of the implement, the blade with its curved extremity constituting a convenient blending tool useful

in performing some of the operations hereinafter described.

The lower surface 6 of the blade (as more particularly illustrated in Figs. 1, 3 and 4) is convexly curved longitudinally of the implement and also preferably, though not necessarily, is convexly curved transversely of the implement. Projecting from this convexly curved surface is a longitudinally extending fin or rib 7. This fin is located substantially midway between the lateral edges of the blade portion of the instrument and may be of narrow, more or less diamond-shape in peripheral contour, such contour being approximately like that of the preferred form of tooth insert as shown to large scale in dotted lines at 7^x in Fig. 5. The fin or rib 7 is narrow transversely, usually being not more than a few thousandths of an inch wide at its widest part and is preferably, though not necessarily, substantially triangular in transverse contour, having the exposed acute edge 8 (Fig. 4). While this rib or fin is desirably of the elongate diamond-shape above referred to, it is contemplated that it may be lenticular or even substantially rectangular in peripheral contour, and while in most instances it is desirable that it be triangular in transverse section, it is contemplated that it may be of other section, for instance substantially rectangular. As illustrated in Fig. 1, the preferred form of rib or fin gradually tapers in height from a point 7^m, near the free extremity of the implement, toward the handle, while from the point 7^m toward the tip of the implement the fin tapers more abruptly. However, if preferred, the fin may be highest at the center point of its length and may taper symmetrically toward its opposite ends.

In most cases the fin acts as a depth gauge and the thickness of the labial layer of enamel in the mould cavity may be determined at will by the use of fins of different heights, or by changing the position or inclination at which the tool is held while performing the blending operation. Obviously, a plurality of tools having blades and fins of specifically different configuration, but within the scope of the present invention, may be provided for selective employment by the user. Thus, referring to Fig. 13, the shank 2^m of the tool is shown as terminating in a blade of a shorter and sharper curvature than that of Fig. 1, and as provided with a fin 7^m which generally follows the curvature of the surface 6^m of the blade. On the other hand, in Fig. 14 the shank 2ⁿ is provided with a blade having a fin 7ⁿ which is very short as compared with the blending surface 6ⁿ of the tool, so that when this blade is used in blending, any indentation formed by the fin may easily be smoothed out and obliterated by the curved tip portion of the blade if desired. Again, as illustrated in Fig. 15, the blade portion has a fin 7^s which extends beyond the tip of the blending surface 6^s so as to form the projecting toe portion 7^t. Obviously, if desired, any such tool may be provided with a plurality of fins, thus permitting more than one indentation to be formed at the same time.

As above noted, this improved implement is designed primarily for use in blending enamel slip in the mould cavity to the desired shape and thickness and simultaneously to indent the enamel so that the enamel may receive inserts to simulate the streaks or the like which occur in the natural tooth. For a better understanding of the intended use of the implement, it is

desirable to outline briefly the several steps in the moulding operation wherein it is employed.

Referring to Figs. 7 to 11, the numeral 9 designates a labial mould block having a series of mold cavities I, II, III, IV, V and VI designed to receive the material which is to form the labial face of the tooth. It is to be understood that a complementary block, having similar cavities for the reception of the material to constitute the lingual surface of the tooth, is associated with the block 9 during certain stages of the moulding operation, but such lingual block is not herein illustrated. The first step in the operation of filling the cavities of the block 9 preferably consists in substantially filling the cavity I with enamel-forming slip 10, the slip substantially filling the cavity as indicated in Fig. 8. Then, by the use of a suitable blending tool, for instance, by the use of the tip and surface 3^a of the implement shown in Figs. 1, 2 and 3, a portion of the enamel slip 10 is formed as illustrated at the mould cavity II and in Fig. 10 so as to provide a hollow or recess at 11, while leaving intact an incisal mass 10^a of the slip which extends from the incisal edge toward the gingival end of the tooth. The shaping of the material to form the hollow 11 leaves a portion 10^b of the enamel-forming slip to constitute a lining which integrally merges with the incisal mass 10^a and which may extend to the gingival end of the mould cavity or which may terminate at any desired point intermediate the gingival and incisal ends of the tooth. However, this lining 10^b is ordinarily quite thin as compared with the incisal mass 10^a.

The implement of Figs. 1, 2 and 3 is also capable of forming indentations or recesses in the enamel-forming material in the mould cavity for the reception of stain-simulating inserts. In thus using the implement, it is so applied to the material in the mould cavity that the convex surface 6 presses upon the material in the cavity and the fin or rib 7 enters into the material, thereby forming an indentation in the material which may or may not correspond to the shape of the fin or rib in accordance with the way in which the implement is manipulated. Ordinarily the implement is pressed against the material in the cavity with sufficient pressure to cause the edge 8 of the fin to extend completely through the slip and into contact with the inner surface III^x (Fig. 12) of the mould cavity. In thus pressing the fin into the slip material, the latter is compacted by the contact of the portions of the surface 6 lying at opposite sides of the fin and thus reduced to the desired thickness.

While a simple pressure of the tool against the slip material in the cavity may produce a desired indentation, it is possible, by rocking the implement slightly either longitudinally or transversely, to change the dimensions and shape of the indentation. Obviously as many such indentations as desired may be formed in the slip material and at whatever locations desired, as illustrated at the mould cavities III, IV, V and VI of Fig. 7. In most instances it is preferable to form the indentations, as illustrated at the cavity III, so that they extend into the incisal mass 10^a and also back into the lining material 10^b. By the use of this tool with its indenting fin, it is possible for the operator to provide indentations either of substantially uniform or varying dimensions at any point desired and with the utmost ease and rapidity.

After these indentations have been formed, a

suitable insert 13 (Fig. 12) of ceramic material is disposed in each indentation, these inserts preferably being of substantially the same peripheral contour as the indentation. If desired, these inserts may be of such depth as to lie wholly within the indentation or they may be arranged to project slightly above the surrounding mass of enamel slip in the mould cavity. These inserts may be moulded or otherwise shaped and may be baked or fused, if desired, before insertion in the indentations in the enamel-forming material. When, as illustrated in Fig. 12, the indenting fin extends to the inner surface of the mould cavity, the edge 14 (Fig. 6) of the insert 13 will be disposed substantially flush with the forward surface of the enamel of the finished tooth.

After the insert or inserts have been placed in the corresponding indentations, the hollow 11 may then be filled with a mass of body-forming material 15 (Fig. 6) or the corresponding mould cavity of the other mould block may be provided with surplus material sufficient to fill the hollow 11. Ordinarily this body-forming material 15 is more opaque than the enamel-forming material 10.

Instead of forming the inserts as independent bodies and disposing such preformed inserts in the indentations in the enamel, the indented enamel slip may be allowed to dry and harden, and the soft body-forming slip may be depended upon to intrude into the indentations when the mould blocks are assembled and pressed together. In this latter event the inserts are integral, forwardly directed portions of the body of the tooth.

The material of the inserts 13 may be of any desired character visually contrasting with the materials in which it is embedded. For some effects it may be more transparent than the enamel-forming material and for other effects more opaque, and its color may be different from that of the enamel or from that of the body-forming material, or both.

After cavities of the mould block 9 have been filled as above described, the mould block 9 is assembled with the complementary block whose cavities have already been filled, the blocks are pressed together and usually subjected to heat, thereby to compact and bake the moulded material preparatory to the removal of the green or hardened teeth from the mould.

While the implement herein described and illustrated is very desirable for the purpose, it is contemplated that modifications thereof with respect to the materials employed or the specific shape, relative arrangement and construction of the parts may be made without departing from the scope of the invention as set forth in the annexed claims.

I claim:

1. A blending implement useful in preparing the enamel layer of an artificial tooth for the reception of striae simulating inserts, said implement comprising an elongate blade, one surface of which is substantially straight transversely but concave longitudinally and which has a smoothly rounded terminal edge, the opposite

surface of the blade being convexly curved both transversely and longitudinally, and an elongate narrow rib arranged substantially midway between the lateral edges of the blade and projecting from said convexly curved surface and extending longitudinally of the latter, said rib having an acute exposed edge and being of a maximum height corresponding to the thickness of the enamel layer in which the insert is to be deposited, the rib gradually tapering in height and in width toward both of its ends from an intermediate point, the concavely curved surface with its rounded terminal edge being useful in hollowing out the lingual surface of the enamel layer, and the convexly curved surface with its rib being useful in compacting the hollowed out enamel layer and in forming indentations therein which extend through said layer to the surface of the mould.

2. A blending implement for use in the manufacture of artificial teeth in which stain-simulating inserts are embedded in the enamel layer, said implement comprising a handle and a blending blade having an elongate work-engaging surface which is convex both transversely and longitudinally, and an elongate narrow rib projecting from said convex surface, said rib being located substantially midway between the lateral edges of said surface and extending longitudinally of said surface and having an acute exposed edge, the rib being of a maximum height approximating the maximum lingual-labial thickness of the stain-simulating insert, and being operative to form an indentation in the enamel-forming slip in the tooth mould cavity for the reception of such insert and to gauge the thickness of the enamel layer in which the indentation is formed.

3. A blending implement for use in the manufacture of artificial teeth in which the enamel layer has stain-simulating inserts embedded in it, said implement having an elongate, transversely convex work-engaging surface and a longitudinally extending narrow rib projecting from said convex surface and operative to form indentations of various shapes and dimensions at the will of the operator in a mass of enamel-forming slip disposed in a tooth mould cavity.

4. A blending implement for use in the manufacture of artificial teeth, said implement having a handle and a blending blade of substantial width, said blending blade having a surface which is convexly curved longitudinally of the blade, and an elongate narrow rib extending longitudinally of the blade and projecting from said convex surface, the rib and blade being so devised and arranged that the rib constitutes a thickness gauge for determining the thickness of the enamel layer in the tooth mould cavity.

5. A blending implement of the class described, said implement comprising a handle and a blending blade, the blade having a convexly curved surface and a narrow elongate rib projecting from said surface, said rib having an exposed acute edge and extending to a point beyond the tip of the blade proper.

SIMON MYERSON.