UNITED STATES PATENT OFFICE.

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TOOTH RESTORATION.

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To all whom it may concern:

Be it known that I, FREDERICK STANWOOD WELDEN, a citizen of the United States, and a resident of the borough of Brooklyn, county of Kings, city and State of New York, have invented a new and useful Process of Tooth Restoration, of which the following specification contains a full, clear, and exact description.

My invention comprises a process for restoring a broken, decayed or malformed tooth, in substantially exact simulation of a natural or properly formed tooth, both in color, shape and texture.

My improved composition used in carrying out my process consists of mineral base of the silicate group, such as feldspar and silica suitably combined with an appropriate flux, such as borax, so that upon the application of heat the compound may be reduced to a fluid condition which will enable it to be run into molds of the proper form for the production of the restoration. With the basic ingredients above named, I also combine other materials, such as bone ash, oxid of tin or infusorial earth, to impart opacity and the requisite texture to the compound. In order to secure the proper color or shade of color, I also add thereto oxids of the various metals, or other substances, such for instance as oxid of titanium or oxid of iron, for creams or yellows, and oxid of iridium or platinum sponge for grays. The temperature required to reduce this compound to a fluid condition will vary with the proportions of the materials and their refractoriness, but I find that the following proportions will enable me to reduce the composition to fluid condition at about 1800 degrees Fahrenheit:

Feldspar	27 parts
Silica	10 "
Calcined borax	28 "
Bone ash	20 "
Ammonium carb	3 "
Magnesium sulfite	6 "

Coloring matter as required.

This is a relatively low fusing point, which is a great advantage in the practical operation of my process. Since it would not be practical to compound these substances in the small quantity required for any operation, I preferably prepare it in advance in different colors or shades, and after fusing the composition, allow it to harden in cakes or small slabs.

An efficient way of forming the casting is to prepare a wax pattern of the portion to be restored by the usual method. A sprue wire of proper size is heated and inserted in the pattern after which the pattern is carefully cleaned. The sprue and pattern are then mounted on a conical crucible former. The investment compound as used by dentists is mixed and a small portion is painted over the wax pattern with a soft brush to avoid air bubbles. The former and pattern are then placed in the crucible ring and the latter filled with investment compound. After the investment has set the sprue is removed from the pattern and crucible. The crucible is next carefully dried by heating it gradually until the wax pattern is burned out leaving a mold of the restoration in the investment compound with the gate leading thereto. The crucible is then pre-heated to approximately the fusing point of the silicate material and placed on a vacuum or pressure casting machine of type commonly used by dentists. A lump of the prepared material of the suitable shade to correspond with the natural tooth of the patient is then placed on the crucible and fused with a non-oxidizing blow pipe flame when the pressure of the machine is applied to the mold and the fused material drawn into the space left by the wax pattern. The heat and pressure is maintained for some time to insure the complete filling of the mold. To obtain a stronger and tougher casting the crucible and contents are slowly heated and cooled several times to anneal the silicate material. The casting is then removed from the mold and cleaned and polished after which it is cemented in position on the tooth.

It is obvious that fillings, inlays, caps, whole teeth and even bridges may be cast by my process.

I claim—

1. The process of forming artificial dentures which consists in making a mold of the desired size and shape, pre-heating the mold, reducing a silicate compound to a fluid condition with a nonoxidizing flame, running the fused silicate into the mold under pressure and maintaining the heat and pressure until the mold is completely filled.

2. The process of forming artificial den-

tures which consists in making a mold of the desired size and shape, reducing a silicate compound to a fluid condition under heat and running the same while fluid into the mold, maintaining the heat on the mold and silicate until the former is completely filled with the latter, cooling the mold and contents and re-heating the same to anneal the casting.

FREDERICK STANWOOD WELDEN.

Witnesses:
EDWARD BULL,
ARTHUR H. BULL.