UNITED STATES PATENT OFFICE.

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METHOD OF PREPARING PORCELAIN TEETH.

SPECIFICATION forming part of Letters Patent No. 418,380, dated December 31, 1889.

Application filed May 13, 1889. Serial No. 310,632. (No specimens.)

To all whom it may concern:

Be it known that we, AARON H. PARKER and ARTHUR H. STODDARD, of Boston, in the county of Suffolk and State of Massachusetts, citizens of the United States, have invented certain new and Improved Methods of Preparing Porcelain Teeth, of which the following is a specification.

Our invention relates to the art or method of preparing artificial teeth composed of a body of mineral earth with an outside coating of vitrifiable material or glaze, the whole being combined with suitable metallic oxides to give the desired color for the various portions of the finished work when the operation of baking is completed.

The object of our invention is to furnish an improvement in the method of accomplishing this result, whereby a gain in time and fuel expended is obtained, together with the certainty of a successful result of the baking, and other advantages hereinafter set forth.

It has long been known that the materials of which artificial teeth are composed could be baked by placing them within a closed chamber or muffle of fire-clay or analogous material, and then subjecting this muffle within a suitable furnace to the action of a high temperature prolonged for a considerable length of time. This method has also within the last ten years been improved by the use as a fuel or combustion material of mingled fuel-gas and atmospheric air, supplied under pressure to the combustion-chamber of the furnace and around the muffle in which the teeth to be baked are placed. It has been found, however, that whether with the old fuel—such as coal or coke—or with that furnished by the mingled gas and air, there was a liability to discoloration in the finished teeth, whereby, instead of the proper color being obtained, a different and objectionable color resulted, due to the operation commonly known as "gasing." It has been believed that this gasing was the result of chemical action, a portion of the oxygen in the metallic oxide employed to give the color having been withdrawn during the baking process by chemical union with substances contained in the vapors in the interior of the muffle. Since the introduction of the gas and air as a fuel, and within a comparatively recent period, it has been proposed to obviate this gasing by providing a constant supply of air to the interior of the muffle during the baking, of atmospheric air from without, the theory being, first, that the air thus introduced into the muffle would supply any oxygen which might otherwise have been given up by the oxide forming the coloring material of the teeth; and, secondly, that the introduction of pure air into the muffle would preclude the entrance therein of products of combustion of the gas and air, and thereby lessen in this way the tendency to gasing. Under all methods, however, which to our knowledge have heretofore been employed for baking porcelain teeth a muffle has uniformly and invariably been used, and it has heretofore been believed that the use of such a muffle was essential, and, furthermore, that it was essential that the products of combustion of the fuel employed should, through the instrumentality of the muffle, be cut off from coming into contact with the porcelain during the process of baking. The muffle, although hitherto universally used, has been generally recognized as objectionable, in that it necessitates an increased area of the heating-chamber and a consequent increased loss of heat by radiation and a greater consumption of fuel, while the difficulty of preparing the muffle and of keeping it free from cracks has been material. Furthermore, while the work is shut up in the muffle it cannot be seen. It has therefore been necessary heretofore, whenever it was desired to examine the work, to open the door of the furnace and muffle, thereby lessening the temperature within the muffle and otherwise causing inconvenience to the operator.

According to our present improvement we dispense entirely with any muffle or other barrier between the work and the combustion medium, and cause the products of the combustion of gas combined with atmospheric air under pressure to pass directly over and upon the porcelain to be baked.

The discovery underlying our invention we believe to be this—viz., that a sufficient

amount of air may be mingled with the gas to form when ignited a fuel capable of producing the intense heat necessary for rapid and successful baking, while at the same time sufficient oxygen is supplied as one of the constituents of the air so mingled with the gas to prevent or neutralize any tendency of the oxygen in the metallic oxide forming the coloring-matter of the teeth to be chemically released, and thereby to prevent discoloration by "gasing," so called.

In carrying out our improved method of preparing teeth we first form the material to compose the body. For this purpose we take silex and feldspar, both in powdered form, and unite them into a plastic mass by the addition of fine clay. The proportions of the ingredients may be varied considerably; but we have found in practice that for a batch of sixty-four teeth three drams of silex and four drams of feldspar may be mixed with one pennyweight of clay. In order to give the finished product the slightly-yellowish tint necessary to imitate nature, we add a pennyweight of oxide of titanium. As the titanium forms the coloring material, it is obvious that in a particular case where a greater or less amount of color is required the proportion of titanium should be varied accordingly. The mixture above described is then dried slightly, molded, and carved to represent or produce the forms of teeth required. The enamel-paste is then applied, this consisting of powdered feldspar for the glaze and suitable metallic oxides to give the desired color. To give the red color of the gum, we prefer to use oxide of gold, and platinum-sponge may be employed to give a bluish-gray tint to other parts of the teeth. The work is now ready to be placed in the furnace, which is accordingly done, an open platinum dish being used as a receptacle for the work, which is thus submitted to the direct access of the products of combustion of the mixed gas and air. These, supplying to the teeth a sufficiency of oxygen, neutralize any tendency of the oxygen in the metallic oxide to be released, as above stated, and thus the discoloration by gasing is prevented.

We claim—

The improved art, method, or process of preparing porcelain teeth, which consists in mixing with the mineral earth base, metallic oxides to give coloring-matter, and then submitting the whole to the direct contact of the products of combustion of a mixture of an inflammable gas and atmospheric air, as set forth.

In testimony whereof we have hereunto subscribed our names this 11th day of May, A. D. 1889.

AARON H. PARKER.
ARTHUR H. STODDARD.

Witnesses:
ELLEN B. TOMLINSON,
JOHN H. TAYLOR.