

UNITED STATES PATENT OFFICE

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DENTAL IMPRESSION MATERIAL

Arthur Fink, New York, N. Y., assignor to Plasto-dent, Inc., New York, N. Y., a corporation of New York

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8 Claims. (Cl. 18—47)

1

This invention relates to dental impression compositions and particularly to such material employing an alginate in admixture with other salts.

These compositions are of the type set forth in Letters Patent No. 2,422,497, granted June 17, 1947, to Stanley E. Noyes and comprising an alginate salt, a gelling agent such as a calcium sulphate, lead silicate, etc. reactive with the alginate, a filler such as diatomaceous earth, and a control or retarder such as a fluosilicate, phosphate, etc.

Such compositions when brought into contact with water are formed into a pasty mass which when introduced into the mouth will harden into an elastic gel. Subsequently a casting is made by pouring another hardening mixture into the impression acting as a mold and this casting is used in the formation of the final denture.

Prior impression compositions have proven disadvantageous in a tendency of the dry mixture to absorb moisture and cake up, making it difficult to mix. After the impression is taken, it must be promptly used because dimensional changes with loss of water occur and the gel tends to be soft with a weak body, and the dental stone or plaster of Paris cast in the impression has a soft powdery surface which interfere with the faithful reproduction of details.

I have found that such alginate compositions are improved by the presence of a minor amount of an alkali metal titanium fluoride or an alkali metal zirconium fluoride and in particular a zirconium or titanium fluoride of sodium or potassium. A small percentage, for instance, $\frac{1}{2}$ of 1% to 7% of such alkali metal fluoride gives greatly improved shelf life to the dry mixture; and controls the setting action by regulating it to just the right length of time; the impression taken with the wet mixture has a tough, strong body and may remain in water for hours with no dimensional changes and it produces cast models with smooth, hard surfaces.

A typical embodiment using a filler powder, for instance, diatomaceous earth (about half, 51%), includes 13% potassium alginate, 7.2% calcium sulphate (partially dehydrated preferably to $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$), 24.4% lead silicate, 2.6% potassium titanium fluoride, and preferably 1.8% trisodium phosphate.

Any other alkali metal fluoride of titanium or zirconium, particularly sodium titanium fluoride or sodium or potassium zirconium fluoride, may be substituted in place of the potassium titanium fluoride. The proportion of fluoride should not

2

be reduced below $\frac{1}{2}$ of 1% but preferably is kept below 7%. It also preferably replaces the fluosilicate frequently employed in prior alginate compositions, such fluosilicate being objectionable in exercising an insufficient control of the rate of setting and in not giving sufficient strength or "body" to the impression.

The partially dehydrated calcium sulphate is preferably in the range of 2 to 10% and combines with the alginate and fluoride filler and this combination imparts to the mixture a smooth texture which sets promptly in several minutes in the mouth to an elastic gel easily stripped from the teeth and accurately preserving the impression.

Lead silicate may be added to the composition in varied proportion, 20% to 40%, for instance, preferably being less than half so that it is in minor proportion; and other silicates such as calcium silicate may be used.

The sodium phosphate, represented, for instance by trisodium phosphate in the formula, is preferably within the range of 1 to 5%.

When omitting the fluoride, the material tends to set too slowly and does not have the desired strength and body. Since it is most important that the gel should set in the mouth within several minutes and that it should form a strong elastic mass, it is clear that the addition of the fluoride is of prime importance.

As noted above, the filler may be in relatively large proportion constituting about half (40 to 60%) of the composition and other powders, such as chalk, silica, clay, etc., may be used instead of diatomaceous earth. In all variations the fluoride may be used to control the characteristics of the impression material and accelerate the reaction to give the desired time of setting and produce a composite formation safely retaining the wetting liquid and holding it against oozing or dripping off onto the patient's tongue in a manner likely to cause gagging. The impression also has "body," resilience, strength and accurate surfacing in the final mass as it is removed from the mouth of the patient.

I claim:

1. A dental impression composition comprising a water-soluble alginate, a gel-forming agent reactive therewith to form the composition into an elastic gel, a filler, and a fluoride of the group consisting of an alkali metal titanium fluoride and an alkali metal zirconium fluoride.

2. A dental impression composition as set forth in claim 1 in which the fluoride is of the group consisting of sodium titanium fluoride, potassium

3

titanium fluoride, sodium zirconium fluoride, and potassium zirconium fluoride.

3. A composition as defined in claim 2 in which the fluoride is potassium titanium fluoride.

4. A composition as defined in claim 2 containing also an alkali metal phosphate salt.

5. A composition as defined in claim 2 containing also lead silicate.

6. A dental impression composition comprising a water-soluble alginate, calcium sulphate reactive therewith to form the composition into an elastic gel, a filler material constituting between about 40% to 60% of the composition, and potassium titanium fluoride constituting about 1/2% to 7% of the composition.

4

7. A dental impression composition comprising a water-soluble alginate, calcium sulphate reactive therewith to form the composition into an elastic gel, a phosphate salt, between about 1/2% to 7% of potassium titanium fluoride, and between about 40% to 60% of a filler.

8. A dental impression composition comprising a water-soluble alginate, calcium sulphate reactive therewith to form the composition into an elastic gel, a phosphate salt, between about 1/2% to 7% of sodium titanium fluoride, and between about 40% to 60% of a filler.

ARTHUR FINK.

No references cited.

15