

UNITED STATES PATENT OFFICE

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DENTAL IMPRESSION COMPOSITION

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1

This invention relates to a new dental impression compound and the method of producing the same.

For many dental purposes such as making of full dentures, partial dentures, bridges, etc., is necessary for the dentist to be able to accurately reproduce portions of the mouth of the subject. Such reproductions often involve the duplication of undercuts of more or less severity, as for instance in the case where a tooth or teeth have been extracted and the adjacent teeth have crowded together.

For many years dental impressions have been taken with materials such as plaster of Paris, or various shellac or wax compositions. These materials have little or no elasticity and while it is not difficult to take some impressions with them, such as for most full dentures, it is not possible to reproduce accurately undercuts without either breaking the impression and re-assembling it as is done with plaster, or taking the impression in sections as is the practice in the use of shellac and wax compounds. The foregoing methods obviously involve time and there is the danger of inaccuracy, as well as discomfort to the patient.

By the use of an impression material which may be introduced in the mouth in a fluid or plastic condition and cooled to an elastic state, it is possible to take an impression which will accurately reproduce all details of the portion of the mouth under examination, and which due to its elasticity, can be removed from any undercuts present without losing the accuracy of the impression.

Due to the narrow range of temperature which the human mouth can stand, rather strict limitations are placed on the types of elastic materials which can be used. These materials must obviously be either fluid or plastic when they are seated to place in the mouth and must change by cooling to an elastic gel which will permit removal from the undercuts without permanent distortion. They must also either harden to a solid or be a sufficiently tough and rigid gel so that they may be used as molds for models of plaster or other compounds to be poured into them.

My dental impression material is composed of a suitable gel forming agent which may be obtained, for example, from the various marine algae including gigartina, chondrus, bladder wrack, kelp, gracilaria, or agar-agar. If the gel forming agent is alginic acid it may be converted into the form of a salt, as for example, sodium alginate, potassium alginate, ammonium alginate

2

or mixtures thereof. The salts of alginic acid are used in the impression material to render the product elastic.

To the gel forming agent then is added a heavy metal silicate such as for example lead silicate or zinc silicate. The exact chemical reaction which takes place on the addition of the lead or zinc silicate to the dental composition is not fully understood but it is definitely known to affect the conversion of the gel forming agent from the soluble to the insoluble form. For example water soluble alkali metal salts of alginic acid are converted over to the insoluble form.

To the foregoing composition then is also added a water soluble phosphate such as sodium, potassium or lithium phosphate. Sodium hexameta-phosphate may also be employed. Sodium tetra-pyrophosphate has also been found to be especially satisfactory by reason of its limited solubility in water.

To the foregoing there is also added a metal fluosilicate such as aluminum fluosilicate. Fluosilicates of other metals such as zinc, calcium or magnesium may also be used but aluminum fluosilicate is preferred.

To the above composition there is finally added a filler such as diatomaceous earth, manganese carbonate, or talc which is insoluble in water and which is easily wetted.

The following is a specific example of my new dental composition: 9 grams filler (diatomaceous earth), 6.5 grams lead silicate, 1.25 grams aluminum silicofluoride, 2.25 grams sodium alginate and 0.2 gram tetrasodium pyrophosphate, are placed in a finely divided and dry form in a tumbling keg or mixer and mixed until a uniform blend is obtained. This mixing should be so conducted that the temperature in the tumbler or mixing device does not exceed 100 to 110° F., otherwise the final composition may be damaged. The blended material is then withdrawn from the tumbling or mixing device and thoroughly mixed with 50 cubic centimeters of water with a spatula until a smooth creamy mixture is obtained which sets in a short time to an elastic gel. In practice this creamy mixture is placed in a dental tray which is placed in the mouth of the patient where it sets up in the form of the elastic gel in from three to six minutes. The setting time can be varied by varying the temperature of the water used. Cold water will retard the set and warm water will hasten it. This control can also be maintained by varying the amount of the powdered composition used in combination with water. The greater amount of powder used

3

in relationship to the water the more time will be required to obtain the proper set.

An impression containing the above composition can be removed from the mouth after setting without breaking, tearing or distorting and will allow dental stone or plaster of Paris to set hard against its surface with extreme accuracy. This impression material also possesses the quality of not requiring a separating medium or fixing bath before pouring dental stone or plaster of Paris into the impression. Furthermore, it can be stored over a long period without deteriorating.

The specific mixture of ingredients set forth above in the example can be modified without departing from the spirit of the invention.

In addition to the use of aluminum-silicofluoride I may also use manganese and calcium silicofluoride. Sodium or potassium silicofluoride cannot be used because of its high rate of reactivity with the sodium alginate. The aluminum silicofluoride appears to be the most satisfactory form of silicofluoride (fluosilicate) since its rate of reaction with the sodium alginate produces a composition which sets up at a satisfactory rate in the patient's mouth.

I claim:

1. A dental impression composition comprising lead silicate, an alkali metal alginate, aluminum fluosilicate (silicofluoride) and tetrasodium pyrophosphate.

2. A dental impression composition comprising

4

lead silicate, an alkali metal alginate, a silicofluoride selected from the group consisting of aluminum, zinc, calcium and magnesium fluosilicates and an alkali metal phosphate salt.

3. A dental impression composition comprising lead silicate, sodium alginate, aluminum fluosilicate, an alkali metal phosphate salt and water.

4. A dental composition comprising lead silicate, a filler, aluminum fluosilicate, an alkali metal alginate and an alkali metal phosphate salt.

5. A composition as claimed in claim 4 in which the phosphate salt is tetrasodium pyrophosphate.

6. A composition of matter as claimed in claim 2 which also contains a filler and in which the phosphate salt is tetrasodium pyrophosphate.

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