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PLASTIC MATERIAL FROM VEGETABLE GLUES

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This invention relates to moulding materials made from vegetable glues and in particular to moulding materials suitable for use in dental work.

Hitherto, gypsum has been very widely used as a material for taking impressions (dental plastic). While having the advantage of giving good reproduction of the parts to be modelled, it has the great disadvantage for dental purposes that on account of its non-elasticity the impression cannot be withdrawn from the mouth in one piece but only in separate sections, which must then be joined together again. There have also been used so-called composition masses, on the basis of resins and waxes with additions of stearic acid, talcum, etc., which are as lacking in elasticity as gypsum or are entirely non-elastic. Rather, more elastic compositions have become known which consist of artificial resins. Amongst other things, polymerisation products of acrylic acid esters or similar unsaturated compounds, of vinyl acetate and the like. Some of these composition masses soften at about 45° and set somewhat above the temperature of the body. Gutta-percha is also insufficiently elastic. The common feature of all these materials is that they have so little elasticity that on taking impressions they become warped or buckled. If an impression is taken with these materials there is always the danger of strains being set up and thus giving inaccurate models.

A material has been proposed recently for the moulding of sets of teeth, sculptor's work and cosmetic purposes, which material is mainly composed of a mixture of water, agar-agar, or other seaweed product with known additions of vegetable glue, resins, waxes, and fatty materials; and further, of caoutchouc, filling materials such as talcum, iron oxide, kaolin; fibrous materials such as cotton wool and of disinfectants. The addition of caoutchouc is intended to increase the elasticity of the mass while fatty substances, such as paraffin, stearin and wax, lessen the stickiness and raise the setting point. All these additions, as mentioned above, had been used hitherto for the preparation of mouldable materials.

The process of production of these materials is very complicated, involving, even in the easiest method of mixing, the most intimate distribution of the additions in the agar-agar basis material by stirring the liquid into the basis material and afterwards treating the mixture in a colloidal mill.

The mouldable material according to the invention comprises essentially vegetable glues such as agar-agar, carrageen, seaweed and lichen

preparations, as well as brown algae preparations, such as, for example, laminaria digitata and the fucoid which may be produced therefrom and clay or other gel-forming material, i. e., such materials as have a high water-binding and swelling property. Other modifying materials as hereinafter specified may be also incorporated for giving special properties to the composition.

A known material for taking impressions comprises also a vegetable glue, such as agar-agar, but in association with an oil or oily material, a wax, a ballata-like thermoplastic substance and a thermoplastic resin. In other words the materials associated with the vegetable glue are all hydrophobic materials. Vegetable, animal or mineral oils or in some cases fatty acids, serve as plasticising agents for the thermoplastic additions. In contradistinction to this prior proposed composition, the mouldable material according to the present invention contains as additional material to the vegetable glue a hydrophile substance while the ordinary additions hitherto have been of a hydrophobic nature. The substances selected according to the present invention having sufficiently high water-binding and swelling properties are, as a result of these properties, able to bind the water colloids given up by the vegetable glue, such as agar-agar, when heated. The pasty consistency of the mass is not lost but is preserved with great surety. The mouldable material according to the invention is also free of resin and has no tendency to stick as a result of the freedom of resins and other adhesive materials.

In working up the vegetable glue and gel-forming material according to the invention to which may also be added disinfectants, fibrous materials and materials to give a pleasant taste, there is obtained a very viscous plastic mass which is more elastic and firmer when cold than the known compositions and which loses its water less easily. That is to say, it is not so sensitive to heat, may be more easily worked, sets quickly, even at elevated temperatures and gives exceptionally clear impressions; all these properties are exceptionally important in the removal of the impression from the mouth and the filling up of it with gypsum.

Clay and similar gel-forming material, such as iron oxide, are used in accordance with the invention, in view of the gel-forming qualities of these substances.

In the first place clay which has been made into a slurry with water so as to have become of a gel-like plastic consistency particularly the very plastic clays are most suitable. Kaolin is not so suitable on account of its lower binding

power. In addition to or instead of clay, other gel-forming materials, such as hydrated iron or hydrated alumina or silica may be used, i. e., materials which have exceptional water binding properties or swelling power.

Cellulose ethers, such as, methyl cellulose, which in the unswelled condition have a fibrous structure may be used as further additions. These materials have properties which lie intermediate those of a water cotton wool pulp when warm and a slightly sticky thick glue which can be drawn into threads of a gel-like character in the cold. The properties veer towards one or other extreme according to the substituting radicle and make the cellulose derivative exceptionally suitable for fulfilling the following functions. Along with the other materials they cause the mass to solidify while warm and increase the pasty, clayey, consistency when warm. In order to prevent any sticking of the mass to the mould, fatty alcohols or similarly acting materials may be used. Fatty alcohols may be worked up with water when warm into emulsions on account of their hydrophile character, particularly in the presence of emulsification agents, and on cooling to about 45° the said emulsions set to gel-like pasty suspensions. Soap solutions, sulphonated fatty alcohols, sulphonated waxes, alkyl- and aralkyl naphthalene sulphonic acids and other substances known as wetting and emulsification agents may be mentioned as emulsification agents for the purpose of the present invention.

The process of production which in contradistinction to known processes is particularly simple, may be carried out in open or closed heated vessels.

The following are examples of compositions in accordance with the invention:

Example 1

Mouldable material from vegetable glues and gel-forming materials without further additions:

	Parts
Water.....	10
Silica gel (water-containing).....	2-10
Agar-agar.....	1- 1.5

Or

	Parts
Water.....	7
Clay.....	0.5-2
Fucoid.....	1

Or

	Parts
Water.....	10
Aluminium hydrated oxide.....	5-10
Agar-agar.....	1- 1.5

Example 2

Mouldable material from vegetable glues, gel-forming materials and cellulose ethers:

	Parts
Water.....	10
Silica gel.....	8
Methyl cellulose.....	0.01- 0.8
Agar-agar.....	1.0 - 1.5

Example 3

Mouldable material from vegetable glues, gel-forming material and fatty alcohol:

	Parts
Water.....	7
Fatty alcohol mixture emulsion.....	0.4-1.5
Aluminium-iron hydrated oxide.....	0.5-1
Agar-agar.....	0.6-1.5

Example 4

0.2 part of quinosol is dissolved in 63 parts of water and one part of emulsification agent such as fatty alcohol-sulphuric acid ester or soap, is added. 0.4 part of alkyl cellulose and 1.4 parts of iron oxide red gel are worked into the mass. 8 parts of plastic so-called modelling clay with 25% water are then added together with 5 parts of cetyl alcohol and finally worked up after the addition of 0.1 part of a taste-improving agent (vanilla and menthol in equal parts) with 12 parts of agar-agar (ground).

Methyl-ethyl- or benzyl cellulose may, for example, be used as the alkyl cellulose.

Instead of cetyl alcohol other fatty alcohols or mixtures of fatty alcohols of higher melting point, for example, a mixture of fatty alcohols having a melting point of about 52° may be used.

The composition of the mass may be altered according to the particular purpose for which the material is required.

The new material may be used for all impression or moulding work, for example, in artistic industry or in the modelling art. Further for any purpose where the elastic and plastic properties are of importance.

The addition of glycerine gelatine is only required for special cases; it is, as a rule, unsuitable for impression materials used in the art of dentistry, because the smoothness of the impression is injured. Hardened gelatine brings about a better tensile strength; the same properties can be attained by sliced up cotton wool or other short fibre material (dump fibres) because the distribution is better and a greater number of fibres are obtained for the same weight per unit surface.

We claim:

1. A plastic material comprising a vegetable glue, an inorganic oxide gel material in the form of a paste and a cellulose ether.

2. A plastic material comprising a vegetable glue, an inorganic oxide gel material in the form of a paste and a fatty alcohol emulsion.

3. A plastic material comprising agar-agar and an inorganic oxide gel in the form of a paste, a cellulose ether, an emulsion of fatty alcohols and fibrous material in short lengths.

4. A plastic material comprising agar-agar and an inorganic oxide gel in the form of a paste, a cellulose ether, an emulsion of fatty alcohols.

5. A plastic material comprising agar-agar, an inorganic oxide gel and a fatty alcohol of a higher molecular weight in the form of a paste.

6. A plastic material comprising agar-agar, an inorganic oxide gel and a cellulose ether in the form of a paste.

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