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BUILDING CONSTRUCTION MATERIAL

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7 Claims. (Cl. 106—34)

This invention relates to a moldable composition for such use as building blocks, plaster boards, and plaster for the walls of rooms. The object of the invention is to produce such a substance cheaply, as will have greater tensile strength, be lighter and have better adhering quality than heretofore. In carrying forward this general object, it is purposed that chemical reactions be so harnessed as to effect an automatic fabrication of what when finished is a composite mass. It is an object that the finished mass comprise a mineral-like body interspersed with uniformly distributed long filaments. It is well known that a mass of fibers of filaments cannot be mixed with water and plaster of Paris so as to get uniform distribution of the fibers throughout the mass before the plaster of Paris is partially or wholly set or granulated. From this aspect of the invention, it is an objective to mix the plaster of Paris with a wetting water solution which for mixing requires nothing more than the degree of stirring required to wet the pulverulent plaster of Paris, and further this water solution must be such that the taking up of this water into water of crystallization for the resulting gypsum automatically forms in situ the filamentary or fibrous binder uniformly distributed throughout the sulphide mass, so that the said filaments are correctly described as being borne in their final position, being locally nascent or being nascent in situ. It is preferred that the water solution employed be such as to precipitate fibrous filaments of a cellulose derivative.

The uniformly distributed filaments of a cellulose derivative may therefore be termed nascent in the set or setting gypsum mass and by this term nascent is meant what is set forth above.

Illustrative embodiments of the invention are described in this specification substantially merely for purposes of illustration and to explain the scope of the claims to which they are directed solely for purposes of illustration.

Any commercial source of cellulose may be employed such as dry wood pulp, short cotton waste, cotton lint, old newspapers, and sawdust. The commercial cellulose is preferably first made fine as by grinding, or if it is sawdust or cotton lint, in its natural state. This cellulose is then saturated with about its own weight of a solution of caustic soda of a strength preferably three parts by weight of water to one part by weight of caustic soda. To the thoroughly saturated cellulose is then added and mixed carbon disulphide in an amount preferably about one to two times the weight of cellulose employed. The carbon disulphide should be added to the mass in a closed container many times larger than the mass of materials contained therein, preferably with the materials localized in the bottom, which locality of the container should be maintained at a temperature of approximately 110° Fahrenheit, and it is preferred that the upper portion of the container be chilled to condense any rising vapors of carbon disulphide and return it to the mass in the bottom. Agitation of the mass is preferable. A jelly-like substance results which is substantially transparent and reddish in hue. Into this jelly-like substance water is mixed to reduce the viscosity to whatever viscosity is desired. It has been found satisfactory to add to the said jelly-like mass from three to five times its volume of water. The jelly readily goes into water solution. Plaster of Paris is then mixed rapidly with this viscous cellulose derivative solution in the same way as if water were being used to slate the plaster of Paris. The plastic mass is then run into molds or on to sheet paper board or applied to lathing. In fact, it is manipulated the same as if it were ordinary plaster of Paris mixed with water.

It is preferable, however, that some chemical acting as a fixing agent for the cellulose derivative be employed at the time of the mix with the plaster of Paris to improve the quality of the resulting cellulose derivative. It has been found satisfactory if about an amount equal to 1% by weight of the plaster of Paris of mixed alum and sodium chloride be first admixed dry with the plaster of Paris before adding the viscous solution to form a plaster. Equal division by weight between the alum and the sodium chloride is a good mix. By increasing the proportion of salt to the alum, the time for setting of the plaster is shortened and vice versa. The purpose of the alum is to improve the character of the resulting filaments of cellulose derivative, or as it were, fix them.

Quite obviously, the problem of mixing the plaster of Paris with the slightly viscous water solution is substantially the same as mixing plaster of Paris with water, and substantially the same procedure should be followed, a minimum amount of agitation to effect a thorough uniform wetting of the plaster of Paris being the objective. The proportions of the viscous solution of plaster of Paris may be varied the same as if water were employed, it being understood by those practiced in this art that all excess of water above that required for the water of crystallization must be dried out of the resulting gypsum. It is therefore expedient to keep the amount of water down to

only a slight excess above the amount required for water of crystallization and to give the degree of plasticity required for the plaster.

It has been found that when compounded and manipulated as described herein, the resultant plaster block is of lower specific gravity, that is, greater bulk for its weight than a block made out of plaster of Paris and water, and that its mass is interspersed with myriads of tenous filaments extending in all directions, locally nascent, but not touching each other, or for the most part, not touching each other, so that the resulting plaster instead of being brittle takes on a different character. Nails may be driven through it near the edge without fracturing, a shaving may be cut from it with a knife, and it adheres well to paper or paperboard.

It has also been found that instead of the alum and salt to be admixed with the plaster of Paris as a fixative for the cellulose derivative, that the alum and salt may be mixed with the viscous water solution just before mixing with the plaster of Paris, or that 1 or 2% of alcohol mixed with the solution just before mixing with the plaster of Paris may be employed to advantage, or about ½ of 1% of hydrochloric acid may with advantage be mixed with the viscous water solution just before mixing with the plaster of Paris. The use of the hydrochloric acid perhaps has an advantage over the other fixing media by increasing the lightness of the product apparently from the generation of bubbles of gas which slightly expand the mass before setting, and which are retained in the set solidified resultant structure.

Although this new product has been described in connection with a mix with plaster of Paris, it is to be understood that it is by no means limited to plaster of Paris without an inert filler, if such is desired, but it is rather to be understood that the viscous water solution resulting in the cellulose derivative scattered throughout the mass in filaments locally nascent is to be employed when in setting pulverulent material, which for its set depends upon the taking up of water and the changing of water into water of crystallization. For example, it is contemplated that this viscous water solution may be employed in forming magnesium oxychloride cements. It is however, preferable in the practice of the invention to use the mix with plaster of Paris with or without added fillers. It is also to be understood that although satisfactory proportions have been described, the claims are by no means to be limited to these proportions, as it has been found that considerable variation is permissible.

The uniformity of the distribution of the filaments of cellulose derivative throughout the set gypsum mass of my invention or the "uniformly distributed filaments" as contemplated in this invention is such an addition as cannot be brought about by mixing filaments already existing with water and plaster of Paris to bring about a set mass of plaster of Paris and a uniformity in the distribution of the filaments. The kind of uniformity which I contemplate is such that results from the kind of uniform distribution that water can make when mixed with plaster of Paris. My filaments do not exist when the plaster of Paris is mixed with the water-carrying liquid. What becomes the filaments is in solution in the water so that the filament-making material is easy of uniform distribution and thereafter the filaments form in a uniformly distributed state.

What I claim and desire to secure by United States Letters Patent is:

1. A set gypsum mass having throughout its mass uniformly distributed filaments of an originally water soluble cellulose derivative.

2. A set gypsum mass having distributed throughout its mass locally nascent filaments of an originally water soluble cellulose derivative.

3. A set gypsum mass having throughout its mass distributed locally nascent filaments of an originally water soluble cellulose derivative.

4. The process of forming a reinforced set mass of gypsum comprising digesting a commercial cellulose in a water solution of caustic soda; adding to said mass under confinement and mixing therewith carbon disulphide to form a viscous water soluble substance; diluting said substance with water; wetting a mass of pulverant plaster of Paris with a sufficient amount of said diluted substance to supply the water of crystallization necessary to change said plaster of Paris into gypsum; and maintaining the wet plaster of Paris free from agitation until setting has taken place and cellulose derivative filaments have been precipitated.

5. The process as described in claim 4 but further characterized by the fact that a fixing agent for the cellulose derivative fibers is employed.

6. The process of forming a set gypsum mass with a uniformly distributed binder of fibers comprising wetting a quantity of pulverulent plaster of Paris with a water solution of a cellulose derivative; causing the water from said water solution to combine with said plaster of Paris as water of crystallization; and causing said cellulose derivative to change from the fluid state into filamentary solid state in distribution throughout the mass of solid substance resulting.

7. The process of forming a solid set plaster mass comprising uniformly wetting a pulverant mass of a plaster capable of setting by the addition of water of crystallization with a water solution of a cellulose derivative; and causing a part of the water of said water solution to be absorbed as water of crystallization in the mass and causing said cellulose derivative to precipitate out in a fibrous or filamentary state distributed throughout the mass.

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