METHOD OF MAKING SPONGE-FORMING COMPOSITIONS

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No Drawing. Application August 1, 1947, Serial No. 765,649. In France October 14, 1946

1 Claim. (Cl. 106—122)

This invention relates to artificial sponges. More particularly, it relates to an artificial sponge-forming composition wherein the fibers are uniformly distributed throughout the mass.

In the most generally employed process for the manufacture of artificial sponges, a pasty or plastic sponge-forming composition comprising a solution of a cellulose or other substance, fibers, and a pore-forming material such as a fusible and/or soluble granular material, was molded into a desired shape and, after coagulation, subjected to appropriate finishing treatments. The sponge-forming composition was prepared by mixing the solution with the fibers and thereafter the pore-forming substance was incorporated.

In the manufacture of artificial sponges from viscose, the pasty or plastic sponge-forming composition, which consisted essentially of viscose, appropriate length fibers of flax, hemp, etc., and crystals of sodium sulfate decahydrate, was molded. After coagulation by means of a hot concentrated solution of sodium sulfate, the molded product was fixed with acid and then subjected to the appropriate finishing treatments. In such process, a concentrated viscose, such as one containing 10% to 14% of cellulose or even more, was utilized.

The fibers of the sponge-forming composition were poorly distributed throughout the mass and even tended in part to form agglomerates which were of course prejudicial to the mechanical strength of the finished sponges.

Many attempts have been made to obtain uniform distribution of the fibers in the viscose sponge-forming composition. One of the proposals contemplated adding a wetting agent to the viscose, but no agent which improved the distribution of the fibers appreciably was found. Preliminary alkaline treatments of the fibers prior to incorporation in the viscose also did not produce satisfactory results.

An object of this invention is to provide a new and improved method of making sponge-forming compositions.

Another object of this invention is to make a sponge-forming composition free of agglomerates of fibers.

An additional object of this invention is to provide a method of incorporating the fibers uniformly throughout the sponge-forming mass.

Other and additional objects will become apparent hereinafter.

The objects of this invention are accomplished, in general, by preliminarily treating the fibers with a solution to wet the same and thereafter incorporating the wetted fibers in the sponge-forming composition. The solution for preliminarily treating the fibers is a solution of medium viscosity, i.e., 10 to 40 centipoises, and is preferably of the same nature as but more dilute than the liquid vehicle of the pasty or plastic sponge-forming composition. Thus, in a viscose sponge-forming composition, the preliminary wetting of the fibers is obtained with a viscose solution which is more dilute than the viscose of the sponge-forming composition.

In the preferred embodiment, the preliminary treatment is obtained by impregnating the fibers with the dilute viscose solution and removing the excess solution in any convenient manner, such as by centrifuging. The details and manner of practicing the invention will become apparent by reference to the following specific example, it being understood that the example is merely an illustrative embodiment of the invention and that the scope of the invention is not limited thereto. Throughout the example, the proportions of the ingredients are parts by weight.

Example

20 g.s. of hemp cut to a mean length of 65 mm. were steeped in 10 g.s. of a viscose containing 1.8% of cellulose and 2.5% caustic soda. After the fibers were impregnated, the excess viscose was removed by centrifuging. The wetted fibers were mixed with 275 g.s. of viscose containing 16% cellulose and 10% caustic soda to form a plastic or pasty mass, and then 400 g.s. of sodium sulfate decahydrate were incorporated into the mass with vigorous malaxing.

The fibers in the resulting pasty or plastic sponge-forming composition were uniformly dispersed and distributed throughout the mass.

The sponge-forming composition was extruded from a press into molds which were subjected to a coagulating treatment, with a saturated solution of sodium sulfate at 105° C., in an autoclave.

The coagulated blocks were removed from the molds and then subjected to the usual finishing treatments.

The artificial sponges obtained by cutting the molded blocks were characterized by an extremely uniform distribution of the fibers and had a breaking strength in all three directions of 0.1 to 0.2 kg./cm.2 greater than that of artificial sponges manufactured by the prior art processes wherein the fibers were not preliminarily wetted.

The viscose solution which is employed for the
preliminary wetting of the fibers is not restricted to the composition set forth in the example. In general, viscose containing 0.5% to 3.0% cellulose can be used for the wetting of the fibers. However, viscose containing more than 3% and less than 0.5% of cellulose can be used. The viscose employed for the wetting is preferably made by diluting the concentrated viscose which is to constitute the vehicle of the sponge-forming composition.

The viscose of the sponge-forming composition is relatively concentrated and can contain 10% to 14%, or 16% or more, of cellulose. Both the viscose employed for the preliminary treatment and that employed in the sponge-forming mass can be prepared in the usual manner for preparing viscose for sponge-forming compositions.

The dilute viscose employed for the preliminary wetting of the fibers may contain all or part of the soluble colors or pigments which are to be incorporated in the final sponge. It may also contain all or a part of any other appropriate addition, such as wetting agents, fillers, etc., to be incorporated in the sponge-forming composition.

Instead of the use of sodium sulfate decahydrate of the example, the semi-fused sulfate disclosed in copending application of Nicolas Drisch, Serial No. 631,473, filed November 28, 1945, now Patent No. 2,464,772, can be used as the pore-forming substance.

Though in the preferred form of the invention, the pore-forming substance is sodium sulfate decahydrate or fused sodium sulfate decahydrate, it is to be understood that the invention is not restricted thereto and that various other pore-forming substances can be used. In general, crystalline and amorphous substances which melt or dissolve easily can be used. Paraffin, stearin and salts rich in water of crystallization and readily fusible, such as sodium acetate trihydrate, sodium carbonate decahydrate, trisodium phosphate, dodecylate, disodium phosphate decahydrate, potassium sodium tartrate tetrahydro, potassium fluoride dihydrate, and sodium thiosulfate pentahydrate, are illustrative examples of pore-forming substances which may be used. The pore-forming substance may be selected as to size and shape so as to produce a texture very similar to natural sponges.

Instead of hemp fibers disclosed in the example, other textile fibers, such as linen, jute, cotton and the like, of any appropriate dimension can be used.

The proportions of the components of the sponge-forming composition are not restricted to that set forth in the example since they can be modified and varied as is well known in the art.

The sponge-forming composition can be molded into blocks of the desired shape by the use of any appropriate press. The composition is especially suitable for molding in a press, such as is disclosed in French patent of addition No. 43,304 to French Patent 812,503.

The invention provides a simple and economical process of producing a sponge-forming composition wherein the fibers are uniformly distributed throughout the mass of the composition. By virtue of the uniform distribution of the fibers in the sponge-forming composition, there is obtained artificial sponges in which the fibers are uniformly distributed throughout the mass and have improved mechanical properties.

Since it is obvious that various changes and modifications can be made in the above description without departing from the nature or spirit thereof, this invention is not restricted thereto except as set forth in the appended claim.

I claim:

In the method of preparing an artificial sponge-forming composition comprising viscose, fibers and pore-forming materials, the steps which comprise wetting the fibers with a viscose solution containing 1.8% cellulose, removing the excess cellulose solution and thoroughly dispersing said fibers while still wet in a sponge-forming composition containing 16% cellulose and a crystalline, water-soluble, pore-forming material.

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