

ALIEN PROPERTY CUSTODIAN

STIFFENERS FOR ARTICLES OF APPAREL

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My invention relates to means for stiffening linen and other garments and underwear including shirts, cuffs, collars, caps and the like and it is an object of my invention to provide stiffening means which, while being as efficient as similar means hitherto in use, can be produced and marketed at lower prices.

Hitherto, in order to stiffen linen and other articles of the kind mentioned above, stiffeners made of Celluloid have been used. These stiffeners however involve the disadvantage of rendering the garments impervious for moisture and air. In order to avoid this drawback, the stiffening inserts have been formed with perforations, however, since these perforations showed on the surface of the finished article, such perforated stiffeners have not come into extended use.

Recently fabrics consisting of cotton threads in combination with threads made from cellulose derivatives soluble in organic solvents have been suggested for the same purpose. By moistening such fabrics with a solvent for the cellulose derivatives these latter can be rendered sticky and the fabric can thus be fixed between two layers of the fabric to be stiffened. In this case the stiffened articles may remain pervious to air and moisture, however the mixed fabrics constituting the stiffener proper command a high price and can therefore be used only in combination with the more expensive kind of articles.

My invention is designed to substitute for these unduly expensive stiffeners a stiffening means and adhesive, which, while lending itself to an as simple use as the mixed fabric mentioned above, forms an equally efficient stiffener and does not in any way impair the permeability of the linen goods or the like for air or moisture, while being at the same time far cheaper in production.

The stiffeners according to my invention possess the character of paper-like felted products formed preferably from mixtures of inert fibres and waterproof materials preferably in fibrous form which, when acted upon by an organic solvent or swelling agent, assume the character of an agglutinant, such as the well known cellulose derivatives the kind and proportion of these agglutinant materials being so chosen that, when the paper-like stiffeners are treated with suitable solvents or swelling agents, the agglutinant materials will become sticky and will be suitable for permanently stiffening and gluing together other layers of fabric, while being kept porous owing to their contents of inert materials, i. e. mate-

rials which are not affected by the solvent or swelling agent.

These conditions can be fulfilled in the first place by suitably choosing the proportion between the inert fibres and the softening or soluble cellulose fibres. The strength and dimensions of the fibres and other particles of the components may also be of importance. By suitably tuning the solvents or softeners in accordance with the composition of the agglutinants and by suitably choosing the mode of manufacture of the final product, the period of time during which the solvents or softeners act on the stiffener, the temperature etc. I may provide that between those places, where the stiffener glues the layers of other fabric together, portions pervious to air and moisture are provided. The irregularity, resulting from the manner in which the stiffeners are manufactured, in the arrangement of the sticking and the non-sticking sections of the stiffener together with the possibility of controlling the extension, which may be very small, of the sticky portions, prevent the stiffening inserts from showing on the surface of the stiffened fabric layers.

I may also deposit on the felted stiffener products according to this invention, for instance by spraying or rolling, and in a more or less regular or irregular arrangement and under the form of points, lines, patches, grids or other screen-like patterns a drying solution or paste or the like which impregnates and surrounds the fibres in the stiffener product and which is substantially not attacked by the solvents or softeners, thereby keeping the sections covered therewith porous, and this more particularly, if the matter contained in these solutions or pastes can be subsequently removed by washing or otherwise.

While as a rule the percentage of inert fibres will predominate over the agglutinant fibres in the compound stiffener, a felted product of the kind last mentioned may also consist mainly or exclusively of agglutinant fibres. The covering screens or grids formed by depositing on the fibres or fibre combinations a drying solution or paste and the like may moreover also serve to reinforce the felted product.

As inert fibres I prefer employing in the first place fibres of cellulose pulp, cotton, linen, hemp, nettle and the like, while the agglutinant fibres may be formed from cellulose derivatives such as cellulose acetates and, in view of a better suitability for ironing and superior waterproofness, cellulose triacetate, however also from mixed cellulose esters, cellulose ethers and the like or

resins and more especially artificial resins such as polyvinyl acetate and the like. The covering solutions or pastes forming screens, lines, points, etc. may for instance consist of substances, such as water soluble starch, gum arabic and the like, which are not soluble in the solvents for the cellulose agglutinants. The agglutinants are preferably used in fibre form, but may also be granular or pulverulent. In the preparation of the stiffeners and agglutinants I may also use foreign adhesive substances and fillers, i. e. substances and fillers, which are insoluble in the organic solvents used.

I may further improve the stiffening and adhesive means according to this invention by incorporating therein a light weight preferably wide meshed fabric. Fabrics of this kind are inexpensive and do not materially increase the thickness of the stiffener, but impart strength to the felted product and may thus greatly improve the suitability thereof for application to the articles to be stiffened. These fabrics may be incorporated in the still moist felted product directly after part of the mixture of fibres constituting same has been deposited on the wire or in any other manner known in the art of paper making. I may also glue such wide meshed light weight fabric on or into the felted products, using for this purpose special agglutinants or, alternatively, the adhesive matter forming part of the felted mixture, which may be superficially softened, care being taken to retain the porosity of the product. This preservation of the porosity may for instance be provided for by keeping the quantity of solvent or the quantity of agglutinant material as small as possible. Alternatively I may use a solvent capable of dissolving only part of the agglutinant matter contained in the material to be felted together, or the solvent effect may be lowered by the addition of a non-solvent.

I may unite such a wide meshed fabric with the felted products in a particularly satisfactory manner and without using any kind of agglutinant therefor by so choosing the width of mesh of the light weight fabric and the kind or length of the inert and the agglutinant fibres in the stiffening felt, that the fibres become felted together across the meshes of the light weight fabric, when the mixture is felted on the paper making machine. I may promote this felting together of the fibres by setting the wire of the paper machine vibrating. Also in this case and more especially if fabrics are used, which readily absorb the solvents and solutions, the amount of the inert fibres in the felted products may be reduced or their incorporation may even be dispensed with altogether.

In incorporating the stiffening and adhesive means according to my invention in shirt collars, cuffs, uniform collars, caps and the like I may for instance place the paper-like felted mixture of fibres between the fabric layers to be united and stiffened, slightly fixing it in place between these layers by superficial sewing, stitching or glueing, spreading on the fabric a solvent or swelling agent for agglutinant fibres with a brush or by spraying or causing the agglutinant fibres to swell by acting thereon with a solvent in the vapor phase, whereupon the compound product is subjected to the action of pressure and, if necessary, heat to firmly unite the constituents. If desired, the stiffening material may also be prepared for the stiffening and glueing by immersing it in a suitable solvent and then plac-

ing it between the fabric layers to be united. Before applying pressure etc. care must of course be taken to not destroy the porosity provided by the particular structure of the stiffener and agglutinant mixture, when uniting same with the fabric, for instance by displacing the softened layers under pressure.

In special cases the stiffeners and agglutinants according to this invention may also be combined one-sidedly with a single fabric layer.

In practicing my invention I may for instance proceed as follows:

Example 1

100 kgs. fibriform cellulose acetate and 150 kgs cellulose are ground separately in the rag engine and the ground materials are then mixed, whereupon the ground mixture is treated in accordance with the paper making process for the production of thin paper-like fleeces weighing about 100 grs per m². These fleeces are combined with linen and other wearing apparel for instance by acting thereon with acetone, if cellulose diacetate fibres are present therein, or with a mixture of nine parts by volume methylene chloride and one part alcohol, if cellulose triacetate fibres are present.

Example 2

100 kgs fibriform cellulose diacetate and 50 kgs cellulose are treated as described with reference to Example 1 to produce a paper-like fleece. On this fleece is deposited by means of a fluted pressure roll a small quantity of a solution of 10 parts cellulose tribenzoate in 90 parts toluene. After the toluene has evaporated, the paper-like fleece is impregnated in screen form with the cellulose tribenzoate. Since this latter substance swells only very little in the acetone serving to glue the fleece together with the fabric, the parts impregnated with the tribenzoate are substantially not attacked by the acetone so that in these places no glueing together is effected and the finished fabric remains pervious to air and moisture in these places.

A similar action is obtained in a still more advantageous manner if, after the combined article has been finished, the impregnating matter is subsequently removed again, for instance by acting on the fabric with toluene. This can be effected in the simplest manner if water soluble substances, which can subsequently be washed out with water, are used in the production of the covering screens.

Example 3

Mixed artificial silk wastes, for instance mixtures of cellulose acetate and viscose, in which the latter slightly predominates, are bleached and comminuted in the rag engine to the extent of rendering the ground material suitable for the production of paper-like webs. While depositing the diluted paper pulp on the paper machine wire, a wide mesh gauze fabric is carried in contact therewith and the wire is set vibrating. By suitably choosing the width of the meshes of the gauze fabric with regard to the length of the fibres in the fibre mixture a solid felting of the fibres across the fabric will take place. Products made in this manner have been found to possess a particularly great strength.

Example 4

Cellulose acetate silk wastes are treated for the production of a paper pulp in the manner de-

scribed with reference to the preceding examples. In the ground fibrous material is embedded a cotton fabric formed with about 100 to 200 meshes per cm^2 , weighing about 50 to 80 grams/ m^2 , the whole being felted together in such manner that the total weight of the combined product amounts to about 100 to 200 grams/ m^2 .

Various changes may be made in the details disclosed in the foregoing specification without departing from the invention or sacrificing the advantages thereof.

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