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ELASTIC MAT FOR UPHOLSTERY AND PROCESS OF MAKING SAME

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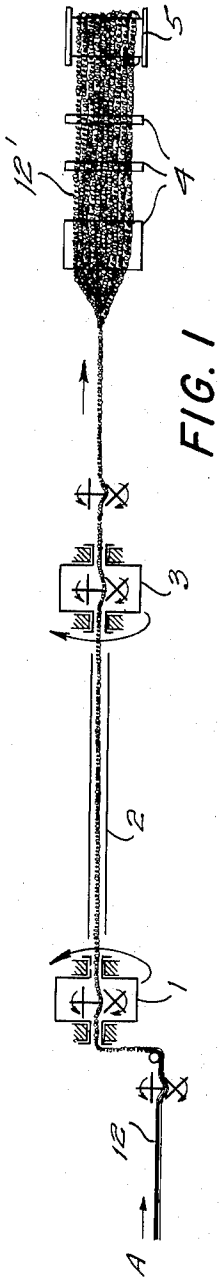


FIG. 1

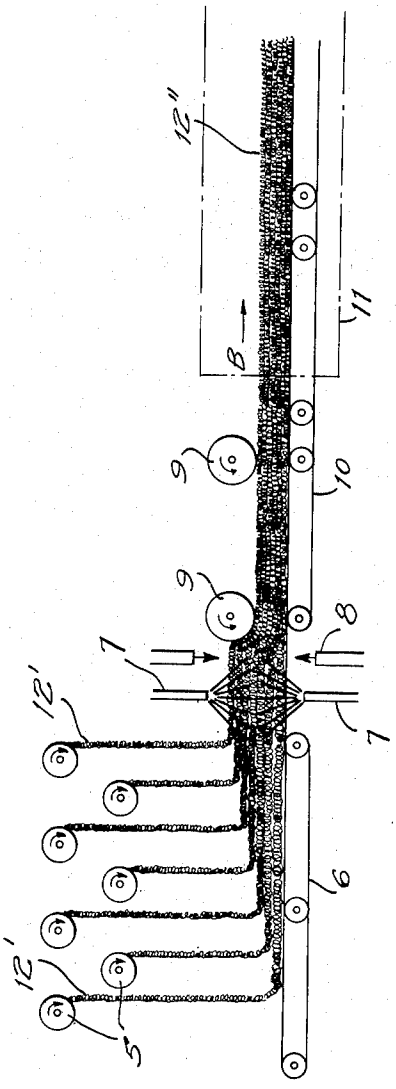


FIG. 2

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ELASTIC MAT FOR UPHOLSTERY AND PROCESS OF MAKING SAME

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9 Claims. (Cl. 154—90)

The present invention relates to process for manufacturing permanently-elastic upholstering material.

It is an object of the present invention to provide a process for treating materials to be used for upholstering so as to make these materials elastic.

It is a further object of the present invention to provide a process for treating materials to be used for upholstering so that these materials will remain elastic permanently in hot and/or damp climates.

It has been known in the past that upholstering materials could be made from artificial threads such as synthetic resin and artificially spun cellulose and cellulose derivative materials preferably monofilar made from viscose which are washed free from the chemicals used for spinning. In fact such materials were produced in one continuous operation by gathering freshly spun artificial monofilaments (artificial horsehair) into a cable, crimping by drying, loosening to form a crimped band of parallel crimped threads, spraying the crimped band with a binder which remains elastic after drying and/or vulcanization, for example an emulsion of rubber latex. A number of such bands are then placed on one another layerwise, pressed and vulcanized in known manner to produce a band of upholstering material.

The above process afforded a method of manufacturing of upholstering material from artificial monofilament threads in a simplified sequence of operations. The upholstering material formed in this manner was then ready, needing only cutting into the desired sizes, for use by the upholsterer. The product thus formed besides being cheaper due to the economic method of production had the advantage of some improved qualities, such as strength and elasticity.

The layers of threads in this process are sprayed with an elastic binder such as rubber latex before the next crimped band is superimposed layerwise upon it. This is then treated under pressure where it is compressed to the desired thickness and then stabilized by vulcanization of the rubber latex mixture.

Although the upholstering material thus produced was substantially elastic it was found that its elasticity was substantially reduced during days with a high relative humidity. Study shows that the diminishing elasticity was interrelated with the water taken up by the material. Swelling caused by the taking up of water into the threads reduced the elasticity. The present invention removes this disadvantage by keeping to a minimium the ability of the threads to take up water.

The present invention provides a process wherein the amount of elastic binder with which the artificial threads are treated is in a quantity of not less than one and one-half times the weight of the artificial threads. In other words the proportionate weight of thread being treated to elastic binder is 1:1½.

By coating these threads with this amount of elastic binder which remains elastic after drying and/or vulcanization the upholstering material made from such

threads retains its elasticity in warm and/or damp climates because the coating reduces to a minimum the amount of water that can be taken up by the threads.

It is necessary to use this large amount of elastic binder in order to assure each individual fiber being completely coated with an excess of binder. Tests have shown that when so coated the upholstering material retains its elasticity permanently.

Tests have further determined that binder in at least one and one-half times the weight of the fibers must be used in order to completely cover each individual fiber so that the fibers can retain their elasticity. Preferably it has been found that the amount of elastic binder should be twice the weight of the threads being coated.

The elastic binder such as rubber latex may be in a solution or emulsion or any other mixture which will facilitate the coating of the threads. This solution or emulsion may be sprayed on the threads or the threads may be drawn through it, the requirement being that the threads take up at least one and one half times their own weight of the elastic binder and preferably two times their weight.

The process of the present invention is applied to materials derived from artificial threads, these materials being treated by an elastic binder or a mixture of elastic binders in an amount at least one and one half times the weight of the material being treated. The material being treated may be a final vulcanized material or it may be a material which has been prepared for vulcanization. In the first case the material would be sprayed or otherwise treated with the elastic binder, the treated material then being dried to remove all traces of water. This dried material may then be used by upholsterers and has the qualities of greater strength and elasticity and the additional particular quality of permanent elasticity in any climate. In the latter case, vulcanization after being sprayed with the elastic binder, the elastic binder may be in a mixture which includes vulcanizing materials. It is also possible for the material to be first treated with vulcanizing material and then sprayed with the elastic binder. In either case the spraying step is followed by a vulcanizing step which causes the elastic binder to firmly adhere to the material derived from artificial thread, the treated material being dried by the vulcanization.

The process of the present invention whether applied to materials before or after vulcanization will yield a distinctly improved product especially in terms of permanent elasticity.

The binders employable with the present process are those which will remain elastic after drying and/or vulcanization, i. e. will not render the fibers brittle or fragile. Excellent results have been obtained with natural rubber latex as binder. This binder as stated above may be mixed with well-known vulcanization additions.

Favorable results have also been obtained with prevulcanized latex concentrates. Other usable elastic binders are emulsions of artificial rubber-like materials for example of mixed polymerizates of butadiene-styrene or of chloro-butadiene polymerizates.

For many purposes artificial resins are also suitable as binders, although the above-mentioned rubberlike substances are preferred. For example, emulsions can be employed which contain as basic substances polymerization products of vinyl acetate, vinyl chloride, and other polymerizable unsaturated compounds.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of

specific embodiments when read in connection with the accompanying drawings, in which:

Fig. 1 is a schematic view of a portion of the apparatus of the invention; and

Fig. 2 is a schematic view of a further portion of the apparatus of the invention.

Referring now to the drawings, it can be seen from Fig. 1 that cable **12**, consisting of a number of monofilar threads is being fed in the direction indicated by the arrow A into a first twisting device **1** which is adapted to produce an over twist. The over twist of the cable is maintained by the second twisting device **3**, shown in Fig. 1 to the right of the first twisting device **1**, the cable **12** between the first and second twisting devices being passed through a drying tube **2**, wherein the cable is dried in order to stabilize the crimping. The cable **12** leaving the second twisting device is automatically untwisted and is then fed to a spreading device **4**, where it is spread out into the band indicated at **12'**, whereafter this band **12'** is wound up on roller **5**, which is shown in Fig. 1.

Fig. 2 shows, in side view, seven such rollers **5** from each of which a band **12'** is being unrolled and fed, in the direction indicated by the arrow B, superposed one on top of the other, onto a conveyor belt **6**. The superposed bands **12'** are then sprayed from the top and bottom with an adhesive elastic binding material by means of the spray nozzles **7** which are located above and below the superposed bands **12'** and to one side of the conveyer belt **6**. To the right of the spray nozzle **7**, as seen in Fig. 2, the arrows **8** indicate the positions where warm air for the drying is blown against the superposed bands, now covered with adhesive elastic binding material. The latter bands are then fed between a pressing device **9** and conveyer belt **10**, where they are compressed to form a mat of elastic material **12''**, which is then subsequently fed to the vulcanizing and heating zone **11**.

The following example is given by means of illustration only and is not meant to limit the scope of the present invention.

400 monofilament threads freshly spun from viscose and having an individual titer of 1000 deniers coming from one or more spinning machines were washed in the form of a cable and predried to a water content of approximately 50%. The cable was fed to a twisting device, known per se, which produced an overtwist. The overtwist of the cable was maintained by a subsequent twisting device and the cable between the two twisting devices passed through a drying tube where it was dried to a water content of 12% so as to stabilize the crimping. The cable leaving the second twisting device untwisted itself automatically, was spread out into a crimped band of 60 cm. width and wound up on rolls in this width. Seven such rolls were sprayed in the above described manner with a 60% rubber latex mixture containing the necessary vulcanizing conditions. For each 9 meters of band containing 400 threads the amount of rubber latex sprayed was equal to 800 grams of rubber latex. This is an amount equal to twice the weight of the threads being sprayed.

The multi-layered endless structure produced in this way having a width of 60 cms. and a height of approximately 10 cms. was continuously compressed by means of a pressing device to a height of 5 cms. The band of upholstering material thus produced was predried at 75° C. to evaporate the water introduced with the rubber latex and was then vulcanized at 100° C. in a heating zone. On leaving the heating zone the band of upholstering material was dusted with talcum and made up in a form ready for sale.

It will be understod that each of the elements described above, or two or more together, may also find a useful application in other types of upholstering materials differing from the types described above.

While the invention has been illustrated and described as embodied in a process for the manufacture of elastic upholstering materials, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. A process of producing an elastic mat for upholstery, comprising the steps of forming an elongated loose layer consisting of individually crimped artificial cellulosic filaments arranged with their axes extending substantially in direction of said elongated layer and each having crimps extending normal to the plane of said layer and being arranged haphazardly with respect to the crimps of the other filaments of the layer so as to form a coherent band which is resilient perpendicularly to said plane; and applying to said band an elastic binder substance adapted to be made adhesive by activation in an amount of between one and one-half and two times the weight of said band so as to coat said filaments with said elastic binder; activating said elastic binder substance so as to make the same adhesive, thus causing the filaments to adhere to each other and forming a resilient upholstering mat of crimped adhering filaments.

2. A process of producing an elastic mat for upholstery, comprising the steps of forming an elongated loose layer mass consisting of a plurality of superimposed layers each of which consists of individually crimped artificial cellulosic filaments arranged with their axes extending substantially in direction of said elongated layer and each having crimps extending normal to the plane of said layer and being arranged haphazardly with respect to the crimps of the other filaments of the layer so as to form a coherent band which is resilient perpendicularly to said plane; applying to said band a solution of an adhesive elastic binder substance, said elastic binder substance being in an amount of between one and one-half and two times the weight of said band, thus coating said filaments with said elastic binder; and drying said band of filaments coated with said elastic binder so as to cause said binder to adhere to said filaments, thus causing the filaments to adhere to each other and forming a resilient upholstering mat of crimped adhering filaments.

3. A process of producing an elastic mat for upholstery, comprising the steps of forming an elongated loose layer mass consisting of a plurality of superimposed layers each of which consists of individually crimped artificial cellulosic filaments arranged with their axes extending substantially in direction of said elongated layer and each having crimps extending normal to the plane of said layer and being arranged haphazardly with respect to the crimps of the other filaments of the layer so as to form a coherent band which is resilient perpendicularly to said plane; applying to said band an emulsion of an adhesive elastic binder substance, said elastic binder substance being in an amount of between one and one-half and two times the weight of said band, thus coating said filaments with said elastic binder; and drying said band of filaments coated with said elastic binder so as to cause said binder to adhere to said filaments, thus causing the filaments to adhere to each other and forming a resilient upholstering mat of crimped adhering filaments.

4. A process of producing an elastic mat for upholstery, comprising the steps of forming an elongated loose layer consisting of individually crimped artificial cellulosic filaments arranged with their axes extending substantially in

direction of said elongated layer and each having crimps extending normal to the plane of said layer and being arranged haphazardly with respect to the crimps of the other filaments of the layer so as to form a coherent band which is resilient perpendicularly to said plane; and applying to said band an adhesive rubber latex binder in an amount of between one and one-half and two times the weight of said band so as to coat said filaments with said rubber latex binder, thus causing the filaments to adhere to each other and forming a resilient upholstering mat of crimped adhering filaments.

5. A process of producing an elastic mat for upholstery, comprising the steps of forming an elongated loose layer mass consisting of a plurality of superimposed layers each of which consists of individually crimped artificial cellulosic filaments arranged with their axes extending substantially in direction of said elongated layer and each having crimps extending normal to the plane of said layer and being arranged haphazardly with respect to the crimps of the other filaments of the layer so as to form a coherent band which is resilient perpendicularly to said plane; applying to said band an adhesive rubber latex binder including vulcanizing materials, said rubber latex binder being in an amount of between one and one-half and two times the weight of said band, thus coating said filaments with said rubber latex binder; vulcanizing said rubber latex binder coated on said filaments so as to cause said binder to adhere to said filaments, thus causing the contacted filaments to adhere to each other and forming a resilient upholstering mat of crimped adhering filaments.

6. A process of producing an elastic mat for upholstery, comprising the steps of forming an elongated loose layer consisting of individually crimped artificial cellulosic filaments arranged with their axes extending substantially in direction of said elongated layer and each having crimps extending normal to the plane of said layer and being arranged haphazardly with respect to the crimps of the other filaments of the layer so as to form a coherent band which is resilient perpendicularly to said plane; superposing a plurality of said bands atop one another so as to form a multiple band thereof; and applying to the thus formed multiple coherent resilient band an adhesive binder substance in an amount of between one and one-half and two times the weight of said multiple band so as to coat said filaments with said elastic binder, thus causing the filaments to adhere to each other and forming a resilient upholstering mat of crimped adhering filaments.

7. An elastic mat for upholstery consisting of an elongated coherent band of individually crimped artificial cellulosic filaments arranged with their axes extending substantially in the direction of said elongated band and each having crimps extending normal to the plane of said band and being arranged haphazardly with respect to the crimps of the other filaments of said band, said filaments being coated with an elastic binder firmly adhering thereto and being in an amount of between one and one-half and two times the weight of said filaments.

8. An elastic mat for upholstery consisting of an elongated coherent band of individually crimped viscose filaments arranged with their axes extending substantially in the direction of said elongated band and each having crimps extending normal to the plane of said band and being arranged haphazardly with respect to the crimps of the other filaments of said band, said filaments being coated with an elastic binder firmly adhering thereto and being in an amount of between one and one-half and two times the weight of said filaments.

9. An elastic mat for upholstery consisting of an elongated coherent band of individually crimped artificial cellulosic filaments arranged with their axes extending substantially in the direction of said elongated band and each having crimps extending normal to the plane of said band and being arranged haphazardly with respect to the crimps of the other filaments of said band, said filaments being coated with a rubber latex binder firmly adhering thereto and being in an amount of between one and one-half and two times the weight of said filaments.

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