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PROCESS OF PREVENTING CURLING OF THE EDGES OF KNITTED FABRICS

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My present invention relates to improvements in producing knitted textile fabrics and to an improved knitted fabric produced by this process.

It is well known that the edges of knitted fabrics curl during the process of finishing, especially while subjected to raising and napping.

It is the main object of my present invention to eliminate this curling and to facilitate thereby the finishing of knitted fabrics.

It is another object of my invention to provide a simple and efficient device which can be attached to knitting or finishing machines for knitted fabrics without any change in the construction of these machines being necessary.

It is still another object of this invention to prevent curling of the edges of knitted fabrics without substantially changing the knitting and finishing processes as used so far.

With the above objects in view, my present invention mainly consists in applying to a knitted open mesh fabric along its longitudinal edges stiffening, preferably flexible, material. This material should be thermoplastic, i. e., it should become plastic and melt on being heated, and become stiff again when cooling off. The term "thermoplastic, as hereinafter used, is to be understood in its broadest meaning, i. e., substantially all materials which can be molten by heat and become stiff by cooling are to be comprehended within the meaning of this term. Thus I consider as thermoplastic not only such materials as cellulose acetates, vinyl resins, polystyrenes, and acrylic resins, but also other cellulose derivatives, such as cellulose nitrates or Celluloid; other synthetic resins, waxes, glue and like substances are also adapted for the purposes of the present invention insofar as they are adapted to be molten by application of heat and to become stiff when cooled. The term "open mesh" as above and hereinafter used, is to be understood as defining knitted fabrics which are not coated over their entire surface but have a mesh structure enabling curling of the knitted fabric along its edges.

In accordance with my invention, this thermoplastic material has to be affixed to the fabric along its edges by application of heat, i. e., by melting the thermoplastic material while in contact with the fabric; the molten thermoplastic material penetrates, partly at least, the knitted fabric and adheres to the same. After cooling off, the stiffening material becomes stiff again, preventing thereby the edges to curl.

My new process may be carried out in various ways: Thus, I may apply to an unheated fabric the stiffening material in heated, molten state; however, I prefer to heat the knitted fabric along its edges and apply to the thus heated fabric portions the unheated stiffening material. In either case, the stiffening material is heated and molten while in contact with the surface of the knitted fabric, thereby penetrating it and adhering to the same.

I wish to stress that, as already mentioned above, I may use for stiffening purposes a great variety of materials: these materials may be water-insoluble, as, for instance, cellulose acetates; or water-soluble, as glue or like substances. It is evident that water-insoluble substances have to be used when the knitted fabric is subjected to processes in which it is wetted, e. g. dyed; water-insoluble stiffening materials should also be used when the stiffening edges are to be part of the finished fabrics. In case that the fabrics are not subjected to wetting during the finishing process, water-soluble stiffening material may be applied; furthermore, such material may also be used when the stiffening edges are to be removed after completion of the finishing process.

The thermoplastic stiffening material may be applied as stated above, in molten state; in this case, it is applied by means of a nozzle, brush, or a roller partly immersing in the heated, molten stiffening material.

If the stiffening material is not heated before application. I have found it best to use strips of this stiffening material for the purposes of the present invention. In this case, the fabric is heated along the edges and simultaneously the stiffening strips are applied to the edge portions of the fabric.

In accordance with a preferred embodiment of my invention, the new process is carried out by guiding at least the edge portion of one face of the knitted fabric over a heated surface and applying to the corresponding edge portion of the other face of said fabric the thermoplastic stiffening material; this is preferably done by pressing a strip of such stiffening material to the heated edge portion of the fabric.

At present, most knitted fabrics are produced by first making a knitted hose and cutting open the same in longitudinal direction. I have found that the above described process of preventing the edges to curl may be combined with the process of cutting open the fabric hose. Preferably the steps of cutting open the hose, applying to the edges formed by this cutting operation stiffening strips of a thermoplastic material, and heating the fabric where these stiffening strips are applied, are carried out substantially at the same time. Thus, my new combined process may be carried out by guiding at least a strip-shaped portion of the inner face of the fabric hose, extending in longitudinal direction of this hose, over a heated surface, applying a stiffening strip of a thermoplastic material to the corresponding portion of the outer face of the thus heated fabric hose while the same is in contact with the heated

surface, and thereafter cutting open the fabric hose in longitudinal direction substantially along the central line of the stiffening strip applied to the fabric hose. Thereby a longitudinal fabric piece, provided along its longitudinal edges with stiffening material adhering to the edge portions of the fabric and preventing curling of the same, is produced.

It is evident that various devices may be used for applying the thermoplastic stiffening strips. One simple and efficient device comprises a heated roller over which are guided at least the edge portions of one face of the fabric, and means for applying the stiffening strips to the corresponding edge portions of the other face of the thus heated fabric while the fabric is in contact with the heated roller. A device for preventing curling of the longitudinal edges of a knitted fabric strip made from a fabric hose, comprises a heating device having a heated surface, e. g. a heated roller, over which is guided at least a strip-shaped portion of the inner face of the hose extending in longitudinal direction of this hose, means for applying a strip of a stiffening thermoplastic material to the corresponding portion of the outer face of the thus heated fabric hose while the same is in contact with the above mentioned heated roller, and means for cutting open the fabric hose substantially along the central line of the stiffening strip thus applied to the fabric hose.

Without further analysis, the foregoing will so fully reveal the gist of my 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 equivalency of the following claims.

What I claim as new and desire to secure by Letters Patent is:

1. Process of preventing curling of the longitudinal edges of knitted open mesh fabric comprising the step of applying to said fabric along said edges flexible stiffening material.

2. Process of preventing curling of the longitudinal edges of knitted open mesh fabric, comprising the step of affixing to said fabric along said longitudinal edges, by applying heat, a thermoplastic stiffening material.

3. Process of preventing curling of the longitudinal edges of knitted open mesh textile fabric comprising the step of applying to said fabric along said edges heated water-insoluble thermoplastic material in such a manner that it penetrates said fabric along said edges and stiffens the same after having cooled off, thereby preventing curling of said edges.

4. Process of preventing curling of the edges of knitted open mesh textile fabrics, comprising the steps of applying to said fabric along said edges a strip of a thermoplastic material and heating said fabric where said thermoplastic strip has been applied, causing said thermoplastic strip to melt, to penetrate said fabric, and to adhere to the same, thereby stiffening said fabric along its edges after cooling off, and preventing curling of the thus stiffened fabric edges.

5. Process of preventing curling of the edges of knitted open mesh fabrics, comprising the steps of guiding at least the edge portions of one face of said fabric over a heated surface, and applying to the corresponding edge portions of the other face of said fabric a thermoplastic stiffening material.

6. Process of preventing curling of the edges of a knitted open mesh textile fabric made from a knitted fabric hose by cutting open the same in longitudinal direction, comprising the steps of substantially simultaneously cutting open said hose, applying to the edges formed by said cutting operation a stiffening strip of thermoplastic material, heating said fabric where said stiffening strips have been applied, causing said stiffening strips to melt, to penetrate said fabric, and to adhere to the same, thereby stiffening said fabric along its edges after cooling off, and preventing curling of the thus stiffened fabric edges.

7. Process of preventing curling of the edges of a knitted open mesh textile fabric made from a knitted fabric hose by cutting open the same in longitudinal direction, comprising the steps of guiding at least a strip-shaped portion of the inner face of said fabric hose extending in longitudinal direction of said hose over a heated surface, applying to the corresponding portion of the outer face of the thus heated fabric a stiffening strip of a thermoplastic material, and thereafter cutting open the fabric hose in longitudinal direction substantially along the central line of the stiffening strip applied to said fabric hose, thereby producing a longitudinal fabric strip provided along its longitudinal edges with stiffening material adhering to said edge portions, and preventing curling of the same.

8. Knitted open mesh fabric, having flexible thermoplastic stiffening material applied to its edge portions.

9. Knitted open mesh fabric, having water-insoluble thermoplastic stiffening material adhering to and at least partly penetrating the longitudinal edge portions of said fabric.

10. Knitted open mesh fabric, having edge portions being stiffened by strips of thermoplastic material adhering to said edge portions and at least partly penetrating the same.

11. Process of preventing curling of the edges of knitted open mesh fabrics comprising the steps of applying heat at least along the edge portions of one face of the fabric and applying to the corresponding edge portions of the other face of said fabric a thermoplastic stiffening material.

12. Knitted open mesh fabric having flexible stiffening material applied to its edge portions.

13. Knitted open mesh fabric having water insoluble stiffening material adhering to and at least partly penetrating the longitudinal edge portions of this fabric.

14. Process of preventing curling of the longitudinal edges of a knitted open mesh fabric made from a knitted fabric hose by cutting open the same in longitudinal direction of the hose, comprising the steps of applying to said fabric hose stiffening material to a strip shaped portion of said hose extending in longitudinal direction of said hose and cutting open said fabric hose in longitudinal direction of said hose within said stiffening material applied to said strip shaped portion of said hose extending in longitudinal direction of said hose, thereby producing a knitted fabric provided along its longitudinal edges with stiffening material adhering to said edges and preventing curling of the same.

ARNOLD EDDY.