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2,549,564

PROCESS FOR FINISHING NYLON FABRIC ARTICLES

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This invention relates to the treatment of articles made from nylon threads which are fibre-forming polyamides derived from polymerizable monoaminocarboxylic acids and their amide-forming derivatives and those derived from the reaction of suitable diamines with dicarboxylic acids or amide-forming derivatives of dibasic carboxylic acids sometimes referred to as synthetic linear condensation polymers, described in patents numbered 2,071,250; 2,071,252 and 2,071,253.

An article, such as a stocking, formed from nylon filaments has heretofore been permanently set as to shape by first knitting the stocking from the nylon threads and then looping the toe portion thereof and then seaming the stocking blank to make a full-fashioned stocking, then inspecting, mending, then placing the stocking on forms and subjecting it to a hot aqueous bath to preset the loops of the stocking and then dyeing the stocking and then giving it a finish boarding at a heat of substantially less than the heat during the pre-boarding operation. Then the stockings were placed in pairs and folded and placed into suitable boxes, ready for shipping.

Another method heretofore employed is such as is set forth in Patent Number 2,333,160, in which the stocking is preferably knitted and then looped and then seamed and then while in loose form subjected to a presetting steam chamber treatment to set the loops therein.

All stockings knitted from nylon yarns have a sizing thereon which is known as PM-90 sizing which is a polyvinyl alcohol, according to directions found in the Dupont Nylon Technical Service Division Section 7, page 1.01 and 1.02 under reprint date of 12-20-46. This method of presetting the stitches in the stockings is a great improvement over the old method wherein a pre-boarding and a final boarding operation were performed on the stockings, as under the method set forth in Patent Number 2,333,160, the stitches were set at a temperature of approximately 185 degrees F. to 190 degrees F., live steam being admitted to the cabinet in which the stockings were laid in loose form, the steam being at a temperature of 212 degrees F., but the cabinet cooled it somewhat, thus providing a hot steam vapor of around 185 degrees F. to 190 degrees F.

It appears from a description in said patent that the stocking was a completed article at this time. His treatment caused a shrinkage in the length of the stockings, thus resulting in puckering of the seams and other imperfections.

In the improved method herein set forth, the

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stocking blank is knitted, or, if it is a seamless stocking, the stocking is knitted, and if a blank, the toe portion is looped and then the bunches of stockings are laid flat in a steam chamber or in a hot water bath and treated with a temperature of approximately 212 degrees F. for about 15 minutes. One method of treating the articles is as follows: The blanks or hose, after being placed in the hot water bath are washed in the bath before the bath reaches 212 degrees F. and when the boiling point is reached, there is added to this hot water bath a solution comprising approximately 10 percent sodium cellulose glycolate, 12 percent hydrogenated wax and 15 percent polyvinyl acetate and 63 percent water, the amount of this solution being added to the hot water bath being approximately 3 percent of the weight of the hose being treated in the hot water bath.

However, it is preferable to put the chemical into the water and then bring it to 212 degrees F. The stockings are then put into the solution for treatment. When done in this manner, resinous size takes the place of the PM-90 size as it is washed off and maintains the firmness of the fabric and clearness of stitch.

This hot water treatment with the above-named solution added thereto serves to preset the stitches in the fabric and eliminates the preboarding operation and all that is necessary is the final boarding operation, which is similar to the preboarding operation heretofore carried out in other methods in which the stockings are placed on forms and passed through an aqueous bath in a closed compartment having a temperature of above 212 degrees F., or somewhat higher than the temperature of the presetting bath so as to give a final set to the stitches.

The solution in the hot water bath in my improved method serves to remove the PM-90 sizing from the stocking blank and instead thereof deposits thereon the polyvinyl acetate as a sizing and thus in subsequent seaming operation, as carried out on the blank, the sizing which has heretofore been accustomed to come off the blank and gum up the seaming machines adhere to stockings and surroundings and cause pull threads when contacted by hose and also the stockings adhere to the machines and other objects which cause pull threads in the stockings. This will not happen because this PM-90 sizing has been removed and in its stead a polyvinyl acetate sizing has been added to the fabric. This polyvinyl acetate sizing which is added to the fabric in the hot water, and which takes the

place of the PM-90 sizing which is removed therefrom by the hot water, holds the stitches in the fabric until it reaches the boarding process and minimizes the occurrence of snagging and pull threads.

Instead of the hot water bath, the fabric may be sprayed with water at approximately 212 degrees F. to which has been added the solution above described which is added to the hot water bath and in the same proportions as in the hot water bath.

After the stockings or stocking blanks are treated in the hot water bath or spray, they are treated at a temperature of approximately 212 degrees F. for about 15 minutes and then they are laid out or hung in a heated room of from 100 degrees F. to 300 degrees F. until dry and then they are ready for seaming, inspection, et cetera, and for the final boarding operation as above described.

Stockings treated according to the above-outlined process will be found to have in the average length of stocking, a length of approximately one and one-half inches shorter than a stocking which has not been so preset with the polyvinyl acetate sizing. The stocking will have a silky feel and since the stockings shrink very little in a dyeing and finishing operation, the length of the seam will remain the same throughout and will not shrink and wave as in previous methods where the stitches have been preset by a hot water bath after the stocking has been seamed.

Briefly the method is as follows: In the case of a stocking blank, the blank is looped or not looped, then subjected to a hot water bath held at a temperature of approximately 212 degrees F. for about 15 minutes and in which hot water bath there is a solution of sodium cellulose glycolate, hydrogenated wax and polyvinyl acetate. This removes the PM-90 sizing and deposits instead thereon a polyvinyl acetate sizing. Then the stocking blank is seamed, inspected, mended, then dyed and then placed on boards and subjected to a temperature above 212 degrees F. Then they are paired and folded and boxed.

In the case of seamless stockings, the stockings are knitted and then subjected to the hot water bath or sprayed at approximately 212 degrees F. with the solution of sodium cellulose glycolate, hydrogenated wax and polyvinyl acetate therein and then the stockings are inspected, mended, and dyed and then subjected to a boarding process such as outlined for the full-fashioned stockings, then paired, folded and boxed, ready for shipment. The stockings can be looped before or after the above treatment, but it is preferable to loop the same after treatment for the above stated reasons regarding seaming.

It is thus seen that I have provided an improved method of treating nylon hosiery wherein not only the stitches are preset while in blank form, or in the case of a seamless stocking, before dyeing and then the blanks are seamed after they have been preset and thus wrinkling occurring as a result of the pre-boarding operation heretofore carried out for the treatment of stockings as outlined in Patent Number 2,333,160 is eliminated since the stocking is shrunk as to length before it is seamed. Furthermore, the subjecting of the stocking to the hot water bath with the special solution therein as above outlined removes the PM-90 sizing before a seaming operation takes place and thus gumming of the

seamers by deposits of starch thereon is eliminated.

In the specification there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. In the process of manufacturing a fabric article comprising synthetic linear condensation polyamide fibres having one type of sizing thereon, the steps of subjecting the article to a liquid bath containing sodium cellulose glycolate, hydrogenated wax and polyvinyl acetate at a temperature of approximately 212 degrees F. while the article is in a substantially loose and unstressed condition and disassociated from any means for predetermining the shape of the article to remove the sizing therefrom and to deposit a different type of sizing thereon and then forming the article into the desired shape and subjecting it to an aqueous medium at a predetermined temperature which is greater than the temperature of the bath to which it has been subjected to set the article in its final shape.

2. In a process for manufacturing a fabric article comprising synthetic linear condensation polyamide fibres having one type of sizing thereon, the steps of presetting the article while it is in a substantially loose and unstressed condition and disassociated from any means for predetermining the shape of the article in a liquid bath containing sodium cellulose glycolate, hydrogenated wax and polyvinyl acetate at a temperature of about 212 degrees F. to remove the sizing therefrom and to deposit another type of sizing thereon, then subjecting the article to a dyeing operation and then placing the article on a suitable form and subjecting the same to an aqueous medium at a temperature which is greater than 212 degrees F. to give the final form to the article.

3. The process of treating an article knitted from synthetic linear condensation polyamide fibers which have been treated with a sizing solution containing polyvinyl alcohol which comprises subjecting the article to a liquid bath at approximately 212 degrees F., said liquid bath containing an agent for removing the sizing from the article and at the same time depositing a different type of sizing onto the article, then dyeing the article and then placing the article on a forming member and subjecting it to an aqueous medium at a temperature of above 212 degrees F.

4. That method of treating a stocking knitted from synthetic linear condensation polyamide fibres having one type of sizing thereon which comprises completing the stocking, then subjecting it to a liquid bath, heated to approximately 212 degrees F. and containing an agent for removing the sizing therefrom, and depositing another type of sizing thereon, then dyeing the stocking, then placing the stocking on a form and subjecting the stocking to an aqueous medium heated to about 212 degrees F. to impart thereto the final form of the stocking.

5. That method of treating a stocking blank knitted from synthetic linear condensation polyamide fibres having one type of sizing thereon which comprises knitting the stocking in blank form, then subjecting the stocking blank to a liquid bath heated to approximately 212 degrees F. and containing an agent for removing sizing

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from the fibres thereof and depositing a different type of sizing thereon, then seaming the stocking, then dyeing the stocking at a temperature of less than 212 degrees F., then boarding the stocking and subjecting the stocking to an aqueous medium at a temperature greater than 212 degrees F.

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