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TEXTILE FIBER AND METHOD OF PRODUCING

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This invention relates to an improved method of sizing textile fibers prior to the weaving operation and to the sized fiber obtained.

It has been customary to apply a sizing composition to textile yarns and fibers before they are woven to provide more efficient working in the weaving operation. For this purpose sizing compositions containing starches, gums, gelatin, sulfonated oils, tallows, and mineral oils have been used. Thus for example, before weaving of cotton yarn a size composed of starch, gums and softeners is usually applied to improve the weaving properties. The starch serves to strengthen the fibers, the gum binds the fibers together and the softener provides lubrication. In the sizing of rayon yarns a sizing composition containing gelatin together with sulfonated oils or mineral oils is used. After the weaving operation the size is generally removed from the fabric by a desizing procedure.

In the case of starch sizes considerable difficulty is encountered in removing the size from the fabric. Starch enzymes, such as diastase-malt, is usually used for this purpose. Such a process is not readily applicable to rayon fibers and for this reason starch does not find much use in rayon sizes. Starch sizes also give fibers which shed appreciably. Gelatin is not very satisfactory as a sizing material because of its non-uniform characteristics and because it requires long soaking treatments for removal from the woven fabric. With use of gums the desizing of the fabric after weaving usually requires quite drastic treatment, such as caustic boiling under pressure. Use of sulfonated oils is not too practical because of the tendency of such materials to become rancid on aging. Sulfonated oils also usually provide too much softening effect and too little lubrication. Mineral oil provides satisfactory lubricating and softening characteristics but is subject to the disadvantage that its impregnation of the fibers is uneven and its removal from the fibers after weaving is non-uniform, usually resulting in oil spots on the fabric.

It is an object of this invention to provide an improved method of sizing both natural and synthetic fibers prior to the weaving thereof. It is a further object to provide an improved sized textile fiber containing an improved sizing composition. Other objects of the invention will appear hereinafter.

These objects may be accomplished in accordance with this invention by sizing textile fibers before weaving with a size composition comprising a solution of a rosin in mineral oil. By use

of the combined properties of rosin with mineral oil greater tensile strength with less solids deposited may be obtained. The sized fibers are characterized by improved smoothness and pliability. Also the size composition may be readily removed from the woven fabric. It has also been observed that a decrease in the amount of shedding in the weaving operation is realized. The disadvantages usually encountered with mineral oil which have severely restricted its use in yarn sizing are removed by use of rosin with the mineral oil.

It has also been found in accordance with this invention that with use of the solution of rosin in mineral oil in conjunction with starch in sizing compositions that a material improvement in fiber strength with a smaller amount of size in the fiber is obtained in comparison with the usual starch sized fibers. The solution of rosin in mineral oil also is advantageous for use in conjunction with other sizing agents as for example, gums, softeners, etc.

In carrying out the method in accordance with this invention, natural or synthetic fibers such as yarns, threads, filaments, etc., are treated with a composition containing a solution of a rosin in mineral oil. The composition may be applied as an aqueous emulsion, as an organic solvent solution, as an aqueous dispersion of an organic solvent solution or as the mineral oil solution of the rosin itself. The proportion of rosin included in the mineral oil composition may be varied depending on the type of sizing desired and the particular fiber being treated. Also the amount of the sizing composition employed will depend on the particular effect desired. With the larger proportions of the mineral oil solution of rosin, the advantages of the invention will be more pronounced. The solution of rosin in mineral oil will usually contain in the range of about 10% to about 85% by weight of dissolved rosin but preferably in the range of about 40% to about 70% by weight of dissolved rosin.

The rosin which may be used may be any of the various grades of wood or gum rosin or the rosin acids contained therein. Modified forms of rosins may also be used such as for example, hydrogenated rosin or polymerized rosin.

The mineral oil useful in providing the solutions of rosin for use in the method of this invention may be for example, the refined type of viscous oil heretofore used in the textile industry. The viscosity of the mineral oil may be varied to suit the characteristics desired in any particular size composition. It may be desirable

in certain cases to include a metallic drier in the sizing composition such as for example, cobalt naphthenate, cobalt linoleate, etc., since with the inclusion of driers a yarn of greater tensile strength may be obtained.

The sizing compositions may be prepared by simply dissolving the rosin in the mineral oil to give a homogeneous solution. If it is desired to use the sizing composition in the form of an emulsion, the solution of rosin in the mineral oil may be emulsified with any of the common emulsifying agents such as the soaps of higher fatty acids as for example, the sodium salts of the sulfuric acid esters of fatty alcohols.

To illustrate the sizing of textile fibers in accordance with this invention the following examples may be cited.

Example I

An emulsion was prepared by emulsifying 85 parts by weight of a 50% solution of WG wood rosin in mineral oil with 10 parts of oleic acid and 5 parts of triethanolamine. One hundred twenty pounds of 60 fluidity corn starch were added to 120 gallons of water and the mixture heated to the boiling point in 1 hour with stirring to gelatinize the starch. Eighteen pounds of the emulsion of the mineral oil solution of rosin were then added and the mixture cooked at the boiling point for 45 minutes. Water was then added to dilute the size to 170 gallons. The sizing composition so obtained was applied at a temperature of 200° F. to 62 x 64-78 inch 18/1 warp 20/1 filling yarn. The sized yarn obtained exhibited excellent tensile strength and elongation and was superior in these characteristics to yarn sized with starch alone.

Example II

Forty pounds of the emulsion of WG wood rosin in mineral oil used in Example I were mixed with 60 pounds of gelatin and the mixture diluted with water to 100 gallons. Acetate rayon warp yarn was then sized with the above composition according to the usual sizing procedure. The sized yarn obtained was characterized by increased strength and the size was readily removable after weaving of the yarn.

Example III

The emulsion of the solution of WG wood rosin in mineral oil described in Example I was diluted to 4% solids content with water and in diluted form used to size skeins of 200 denier, 75 film viscose rayon yarn. The sized yarn obtained was soft and pliable and the filaments were well bound together.

Example IV

A solution of 40% by weight of N gum rosin in mineral oil was emulsified using triethanolamine oleate to give an emulsion containing 40% by weight of the rosin-mineral oil solution. Fourteen pounds of this emulsion and eighty pounds of 60 fluidity corn starch were then heated with agitation at the boiling point until the starch was thoroughly cooked. Water was then added to bring the size composition to a volume of 100 gallons. Cotton yarn was then sized with the above composition according to usual sizing procedure. The sized yarn obtained exhibited increased tensile strength and elongation in comparison with a yarn sized with a comparable starch composition.

As will be evident in the above examples, the

mineral oil solution of rosin provides a means of sizing textile fibers to give sized fibers possessing a distinct improvement over the fibers sized by the usual sizing compositions. Thus the fibers sized in accordance with this invention show improved strength and lubricity, high pliability without stiffness and excellent elasticity. The size is also readily removable from the woven fabric.

It will be understood that the details and examples hereinbefore set forth are illustrative only and that the invention as herein broadly described and claimed is in no way limited thereby.

What I claim and desire to protect by Letters Patent is:

1. The method of sizing textile fibers prior to weaving which comprises treating the fiber with a composition comprising a solution of 10% to about 85% of a wood rosin in mineral oil.
2. The method of sizing textile fibers prior to weaving which comprises treating the fiber with a composition comprising a solution of 10% to about 85% of a gum rosin in mineral oil.
3. The method of sizing textile fibers prior to weaving which comprises treating the fiber with a composition comprising a solution of 10% to about 85% of a hydrogenated rosin in mineral oil.
4. The method of sizing textile fibers prior to weaving which comprises treating the fiber with an aqueous emulsion comprising a solution of 10% to about 85% of a rosin in mineral oil.
5. The method of sizing textile fibers prior to weaving which comprises treating the fiber with a composition comprising a solution of 10% to about 85% of a rosin in mineral oil.
6. The method of sizing textile fibers prior to weaving which comprises treating the fiber with a composition comprising a solution of 40% to about 70% of a rosin in mineral oil.
7. A sized textile fiber adaptable for weaving containing as a sizing a composition comprising from 10% to about 85% by weight of a rosin and 90-15% by weight of mineral oil, said sized fiber being characterized by smoothness, pliability, and by easy and uniform removability of the sizing after weaving.
8. A sized textile fiber adaptable for weaving containing as a sizing a composition comprising from 10% to about 85% by weight of wood rosin and 90-15% by weight of mineral oil, said sized fiber being characterized by smoothness, pliability, and by easy and uniform removability of the sizing after weaving.
9. A sized textile fiber adaptable for weaving containing as a sizing a composition comprising from 10% to about 85% by weight of gum rosin and 90-15% by weight of mineral oil, said sized fiber being characterized by smoothness, pliability, and by easy and uniform removability of the sizing after weaving.
10. A sized textile fiber adaptable for weaving containing as a sizing a composition comprising from 10% to about 85% by weight of hydrogenated rosin and 90-15% by weight of mineral oil, said sized fiber being characterized by smoothness, pliability, and by easy and uniform removability of the sizing after weaving.
11. A sized textile fiber adaptable for weaving containing as a sizing a composition comprising from 10% to about 85% by weight of a rosin, 90-15% by weight of mineral oil, and starch, said sized fiber being characterized by smoothness,

pliability, and by easy and uniform removability of the sizing after weaving.

12. A sized textile fiber adaptable for weaving containing as a sizing a composition comprising from 10% to about 85% by weight of a rosin, 90-15% by weight of mineral oil, and gelatin, said sized fiber being characterized by smoothness, pliability, and by easy and uniform removability of the sizing after weaving.

13. A sized textile fiber adaptable for weaving containing as a sizing a composition comprising from 10% to about 85% by weight of a rosin, 90-15% by weight of mineral oil, and a metallic drier, said sized fiber being characterized by smoothness, pliability, and by easy and uniform removability of the sizing after weaving.

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