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SOLUTIONS, COMPOSITIONS, OF PREPARATIONS FOR TEXTILE AND LIKE PURPOSES AND THEIR APPLICATIONS

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This invention relates to new or improved sizing solutions, compositions or preparations for textile yarns or threads. The said solutions, compositions or preparations are more particularly applicable to yarns or threads of silk, spun silk, or artificial silk, and especially yarns or threads of or containing artificial filaments or fibres of cellulose acetate or other fatty acid esters of cellulose, cellulose ethers and the like, but they may also be applied to textile yarns or threads generally, whether for warp or weft or any other purpose where sized yarns or threads are required.

For the sizing of yarns for textile purposes, various compositions have been employed in the form of solutions in volatile solvents. Such compositions suffer from the general defect that when they dry on the yarn sufficiently hard for sizing they are brittle and dust off in the form of powder when the yarn is put into mechanical operation. On the other hand when they have been made sufficiently soft by the addition of oils, fats or the like to overcome this defect they are sticky and form deposits which prevent partly or entirely the running of the threads, shuttles, etc., in various operations on the looms, knitting frames and other mechanical textile machines. Also in operations such as warping, such stickiness renders the use of threads or yarns thus sized difficult or impossible, as the layers of threads wound on the beams stick together and cannot be unwound in the looms etc. without breakage or injury to the threads, thus rendering weaving etc. impossible or giving defective fabrics.

Moreover certain of these compositions or preparations are liable to affect the fibre detrimentally by chemical action if not removed soon after their application.

According to the invention we make or employ sizing solutions, compositions or preparations comprising or consisting of one or more salts or soaps of resin acids or salts or soaps of naphthenic acids (all hereinafter referred to as salts of resinuous acids) associated with one or more fatty lubricating agents. We prefer to employ resin acid salts or soaps of metals other than sodium or potassium (especially those which are white in colour and insoluble in water) as for instance calcium, magnesium, zinc, aluminium or equivalent metallic soaps, but any other salts or soaps of resin acids may be employed, including, though with less advantage, those of sodium, potassium and ammonium. Similarly in the case of salts or soaps of naphthenic acids we prefer to employ salts or soaps of metals other than sodium or potassium as for instance those of calcium, magnesium, zinc, aluminium or equivalent soaps or salts, but any other soaps or salts of such bodies may be employed, including, though with less advantage those of sodium, potassium or ammonium. The salts or soaps of naphthenic acids, when employed, should preferably be prepared from purified naphthenic acids.

We have found that by employing the salts of resinous acids, in combination with fatty lubricating agents, it is possible to obtain sizing solutions, compositions or preparations which give strong, continuous films or sizing coatings on the yarns or threads, while avoiding the objections of brittleness and liability to dust off on the one hand, and stickiness on the other.

As fatty lubricating agents we employ non-drying oils (preferably fixed oils), fats, waxes or liquid or solid fatty acids. We may with advantage employ, in some cases, in association with the salts of resinous acids and the lubricating agents, soaps of fatty acids, these likewise being preferably soaps of calcium, magnesium, zinc, aluminium or other metals other than sodium or potassium, though we may use fatty acid soaps of sodium, potassium or ammonium if desired. The aforesaid fatty acid soaps, while also having to some extent a lubricating property, tend to impart toughness and pliability to the sizing film or coating on the yarns or threads.

In carrying out the invention the salt or salts of resinous acids may be dissolved in any suitable indifferent volatile solvent or solvents such as benzol, toluol, xylol, oil of turpentine or similar organic volatile solvents, with admixture of the lubricating agent or agents (and with or without the

fatty acid soap or soaps). Suitable proportions are chosen so that after evaporation of the solvent a continuous coherent film or layer of the desired consistency or toughness remains on the threads or filaments, serving the purpose of a size, and not being brittle or sticky or liable to dust off.

The concentration of the sizing solutions, compositions or preparations may vary according to the method of application and the absorbent qualities of the yarn or thread. An appropriate effect can be obtained for example when a quantity of sizing constituent corresponding to about 5 to 10% of the weight of the yarn or thread remains after evaporation of the solvent. It is to be understood, however, that the invention is in no way restricted in this respect and that any higher or lower concentrations may be employed.

It is also to be understood that while it is preferable to employ volatile solvents as mentioned for dissolving and incorporating the salts of resinous acids with the fatty lubricating agent or agents, we may according to the temperature at which the size is to be applied or the nature of the constituents or other circumstances, employ solvents of higher boiling points for this purpose, or emulsifying agents, or, less advantageously, we may melt the resin salt or soap or analogous substance together with the lubricating agent or agents, or even in some cases use the latter at ordinary temperatures as solvents or blending agents for the salts of resinous acids.

The following are some examples of suitable sizes more particularly suitable for application by continuous winding to yarns of artificial silk, but also applicable to other yarns or threads, it being understood that these examples are given only by way of illustration and that they can be varied widely. The parts are by weight.

Example 1

	Parts
Calcium resinate	20
Lard	9
Benzol or xylol	25

Example 2

	Parts
Calcium resinate	20
Zinc oleate	2
Lard	9
Benzol or xylol	25

The sizing solution, composition or preparation may be applied to the threads or yarns by any known or suitable method, for instance by dipping the yarn or thread in hanks, in which case a suitably dilute or fluid solution, composition or preparation will be employed, or by the continuous winding method, e. g. winding the yarns or threads on reels, bobbins, beams or other devices and causing them in transit thereto to travel through a bath of the size or over rollers or surfaces supplied therewith, in such cases a more concentrated or less fluid solution, composition or preparation will usually be employed.

The sizing solutions, compositions or preparations may be applied in the spinning of the yarns or threads, and especially they may be applied, as proposed and claimed in the specification of H. Dreyfus' U. S. Patent No. 1,506,052, or corresponding British specification No. 210,266, to artificial yarns or threads of cellulose acetate or other cellulose esters or cellulose ethers continuously with their production by the dry or evaporative spinning method, that is to say in their travel from the extrusion jets or spinnerets to the winding or twisting and winding devices.

When the sizes are applied to threads or yarns by the continuous winding method, or when they are applied in the spinning of the yarns or threads, and especially when they are applied to yarns or threads of dry-spun cellulose esters or ethers continuously with the production thereof as before mentioned, it is important that the sizes shall be so constituted that in the time elapsing between the application of the size and the winding of the travelling thread on the wind up device the size shall dry sufficiently so as not to be sticky.

The metallic salts or soaps may be prepared in any convenient manner, for example by dissolving the oxide or carbonate of the metallic base in the melted resin or fatty acid or by double decomposition in aqueous solution of a sodium soap by a metallic salt. In the case of salts or soaps of naphthenic acids these may be made in any known way.

The proportions of the non-volatile ingredients of the sizing solutions, compositions or preparations may be varied at will according to the nature of the fibre to be treated, the consistency of the sizing desired and the physical properties required in the ultimate size, such as hardness and strength, pliability and toughness, lubrication. In employing the resinates or salts or soaps of resin acids or naphthenic acids (with or without the metallic or other soaps of fatty acids), together with oily, fatty or waxy lubricants, examples of which are above mentioned, the proportions should be chosen so as to avoid excessive stickiness on the one hand and excessive greasiness on the other. The presence of the metallic bases in the solutions, compositions or preparations has the added advantage of suppressing or reducing the tendency to electrification during the working of the sized yarns.

The size may be removed from the woven fabrics or other materials in any known or suitable way, for example by scouring with

a soap solution, with or without previous subjection to an acid solution.

It is further to be understood that the invention likewise includes the employment of the sizing solutions, compositions or preparations hereinbefore described, in or for any of the various applications or operations herein referred to.

What we claim and desire to secure by Letters Patent is:—

1. Yarns adapted to be subjected to weaving, knitting or other textile operations, said yarn being sized with a composition containing a salt of a resinous acid and a fatty lubricating agent.

2. Yarns adapted to be subjected to weaving, knitting or other textile operations, said yarn being sized with a composition comprising a white, water-insoluble, metal salt of a resin acid, and a fatty lubricating agent.

3. Yarns adapted to be subjected to weaving, knitting or other textile operations, said yarn being sized with a composition comprising calcium resinate and lard.

4. Yarns adapted to be subjected to weaving, knitting or other textile operations, said yarn being sized with a composition comprising a salt of a resinous acid, a fatty lubricating agent and a soap of a fatty acid.

5. Yarns adapted to be subjected to weaving, knitting or other textile operations, said yarn being sized with a composition comprising a white, water-insoluble, metal salt of a resin acid, a fatty lubricating agent and a white, water-insoluble, metal soap of a fatty acid.

6. Yarns adapted to be subjected to weaving, knitting or other textile operations, said yarn being sized with a composition comprising calcium resinate, a fat and zinc oleate.

7. Yarns comprising filaments of cellulose acetate adapted to be subjected to weaving, knitting or other textile operations, said yarn being sized with a composition comprising a white, water-insoluble metal salt of a resin acid, and a fatty lubricating agent.

8. Yarns comprising filaments of cellulose acetate adapted to be subjected to weaving, knitting or other textile operations, said yarn being sized with a composition comprising a white, water-insoluble metal salt of a resin acid, a fatty lubricating agent, and a white, water-insoluble, metal soap of a fatty acid.

9. The process of preparing yarns for weaving, knitting and other textile operations, which consists in sizing them prior to weaving, knitting or other textile operations with a composition comprising a salt of a resin acid and a fatty lubricating agent.

10. The process of preparing yarns for weaving, knitting and other textile operations, which consists in sizing them prior to weaving, knitting or other textile operations with a composition comprising a white, water insoluble, metal salt of a resin acid, and a fatty lubricating agent.

11. The process of preparing yarns for weaving, knitting and other textile operations, which consists in sizing them prior to weaving, knitting or other textile operations with a composition comprising a salt of a resin acid, a fatty lubricating agent and a soap of a fatty acid.

12. The process of preparing yarns for weaving, knitting and other textile operations, which consists in sizing them prior to weaving, knitting or other textile operations with a composition comprising a white, water insoluble, metal salt of a resin acid, a fatty lubricating agent and a white, water insoluble, metal soap of a fatty acid.

In testimony whereof we have hereunto subscribed our names.

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