

UNITED STATES PATENT OFFICE

2,188,167

COMPOSITION FOR APPLICATION TO
TEXTILESWilliam Whitehead, Cumberland, Md., assignor to
Celanese Corporation of America, a corpora-
tion of DelawareNo Drawing. Application October 20, 1936,
Serial No. 106,565

2 Claims. (Cl. 134—23)

This invention relates to new and 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 fibers 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.

An object of the invention is the preparation of a sizing solution, composition or preparation which, when applied to yarns, sufficiently lubricates and binds together the filaments or fibers of the yarns so that they are suitable for any purpose where a sized yarn is required. Another object of the invention is the sizing of yarns with a size which, although it contains a lubricant, is readily scourable from the yarn in hot or cold dilute soap solutions. Other objects of the invention will appear from the following detailed description.

An advantage of the sizing compound prepared in accordance with this invention is that when it is applied to yarn and dried, the same is not so brittle that it breaks down to powder when the yarn is put into mechanical operation.

On the other hand, the sizing compound is not tacky and does not prevent the yarn from running freely in shuttles, looms, knitting frames and other textile devices. In operations such as warping, stickiness of the sizing compound renders the use of the sized threads or yarns difficult or impossible, as the layers of thread wound on the beams stick together and cannot be unwound in the looms without breakage or injury to the threads, thus rendering weaving, etc., impossible or resulting in defective fabrics. Another disadvantage of tacky sizing compounds is that the yarns are bound together into ribbons in slasher operations in forming warps. The sizing composition formed in accordance with this invention are free of the tackiness that causes the above mentioned difficulties.

A further advantage of the sizing composition prepared in accordance with this invention is that it does not affect the fiber detrimentally by chemical reaction if not removed soon after its application. This beneficial feature is of special importance in the sizing or coating of artificial filaments which are attacked chemically by many of the ordinary sizing compounds. The

chemical action of sizes on artificial filaments may result in a breaking down in the strength of the yarn or a delustering, a relustering or other change in the yarn which may not be desirable for the particular application to which the yarn is to be used.

In accordance with this invention a sizing composition, solution or preparation is formed from a mixture of gelatin, a water-soluble resin and a sulphonated vegetable oil or a sulphonated higher fatty alcohol. By a sulphonated higher fatty alcohol is meant the sulphate or sulphonate derivatives of lauryl, palmityl, oleyl and similar alcohols. The general term "sulphonated higher fatty alcohol" also includes the sodium, potassium or amine salts of the sulphonated alcohols. The salts are preferably used as they are neutral in action and do not tend to produce hydrolysis or saponification when employed on yarns containing organic derivatives of cellulose.

The composition of this invention may be formed of from 10 to 15 parts by weight of any suitable gelatin, several grades of which are now commonly employed in sizing compositions, from .5 to 2 parts by weight of a water-soluble resin such as glycol bori-borate, glycerol bori-borate and water-soluble vinyl alcohol resins, and from 1 to 3 parts by weight of a sulphonated vegetable oil or sulphonated higher fatty alcohol. These sulphonated higher fatty alcohols soften the gelatin, have good electric conductivity to keep down static and are moderately lubricative. The oil constituent of the sizing compound may consist of a mixture of oily materials, for instance, from 15 to 100 parts of a sulphonated higher fatty alcohol (preferably in the form of its salts) and the remainder consisting of from 85 to 0 parts of a mineral, vegetable or animal oil or fat which may or may not be sulphonated. The oils employed with the sulphonated higher fatty alcohols may include synthetic oily materials, for example, the mono-, di-, or tri-oleates of glycerol or the mono- or di-oleates of glycol and so on.

The sizing compound as described above, dissolved or dispersed in water, may be applied to the yarn in any suitable concentration. For coating warps at a slasher, a concentration of from 5 to 14% of the sizing composition in water is preferable. Naturally, concentration of the solids in the aqueous coating composition will mainly determine the amount of size applied to the yarn. For the weaving of taffetas and like fabrics from yarns of cellulose acetate, the amount of solids placed on the yarn ascertained after evaporation of the water, may be from 3 to 10%

depending upon the denier of the yarn and the particular weave to which these are to be subjected. For sizing individual yarns, warps for ribbons, warps for knitting frames and the like, other concentrations may be employed to give the desired amount of sizing on the yarns.

The following are some examples of suitable sizing compositions more particularly suitable for application in slasher operations to warps of cellulose acetate yarns and 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 I

	Parts by weight
Gelatin	12.5
Sulphonated olive oil	1.5
Sodium salt of sulphated lauryl alcohol	.5
Water-soluble resin	1

Example II

	Parts by weight
Gelatin	13
Tri-ethanolamine salt of sulphated oleyl alcohol	1
Mineral oil	.25
Water-soluble resin	1

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, the sizing may be effected 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 of furnishing devices supplied therewith. In such a case a more concentrated or less fluid solution, composition or preparation will usually be employed.

The sizing solution, composition or preparation may be applied in the spinning of the yarns or threads, and especially it may be applied, as proposed and claimed in the specification of H. Dreyfus, U. S. Patent 1,506,052, to artificial yarns or threads of cellulose 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 device.

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 and such drying aids be provided that in the time elapsing between the application of the sizes and the winding of the traveling thread on the wind-up device, the size shall dry sufficiently so as not to be sticky. For instance, in the sizing of individual yarns,

the yarns may be led through a chamber containing a drying atmosphere or about a heated roller, or the distance from the point of application of the size to the take-up package may be sufficiently long for air drying. In slasher operations, as known in practice, the yarns after receiving a coating of size are passed about heated drying drums which drive off the water content and reduce the consistency of the size to a point where it is non-tacky before being wound on the beam.

For producing novelty fabrics and the like, a sizing may be applied to the yarn intermittently instead of continuously, thus producing a yarn which has segments which are sized and segments which are in their natural state, i. e. unsized.

The sizing composition described above may be employed in the doubling of individual ends without employing twist or when employing only a small twist. For instance, one or all the ends may be treated with the sizing composition immediately prior to their being joined together and wound upon a package. The sizing composition tends to bind various ends together. If desired the yarn formed from a plurality of ends may be given a coating of size although some or all of the individual ends have already been sized during the doubling operation.

For the purpose of producing stiffened fabric, the sizing composition of this invention may be applied to fabrics by padding methods, spraying methods or other suitable methods of applying a coating to the fabric. Here again the concentration of the aqueous solution or suspension of the sizing compound will depend largely upon the result desired.

It is to be understood that the foregoing detailed description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of my invention.

Having described my invention, what I desire to secure by Letters Patent is:

1. An aqueous composition for use in sizing yarns containing organic derivatives of cellulose, said composition comprising from 10 to 15 parts by weight of gelatin, from 0.5 to 2 parts by weight of a water-soluble resin comprising an ester of a water-soluble polyhydric alcohol with boric acid, from 1 to 3 parts by weight of a substance selected from the group consisting of sulphonated vegetable oils and sulphonated higher fatty alcohols, and water in an amount sufficient to make up the sizing composition.

2. An aqueous composition for use in sizing yarns containing organic derivatives of cellulose, said composition comprising from 10 to 15 parts by weight of gelatin, from 0.5 to 2 parts by weight of a water-soluble resin selected from the group consisting of glycol bori-borate and glycerol bori-borate, from 1 to 3 parts by weight of a substance selected from the group consisting of sulphonated vegetable oils and sulphonated higher fatty alcohols, and water in an amount sufficient to make up the sizing composition.

WILLIAM WHITEHEAD.

CERTIFICATE OF CORRECTION.

Patent No. 2,188,167.

January 23, 1940.

WILLIAM WHITEHEAD.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, line 49, after the word "cellulose" first occurrence, insert acetate, and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 12th day of March, A. D. 1940.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.