

UNITED STATES PATENT OFFICE

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PROCESS OF TREATING TEXTILE FILAMENTS

No Drawing. Original application filed March 17, 1928, Serial No. 262,597. Divided and this application filed May 23, 1929. Serial No. 365,572.

This invention relates to a process of lubricating textile yarns whereby such lubrication can also be effected simultaneously with another operation in the processing of the yarn when desirable. This application is a division of my prior U. S. application 262,597, filed March 17, 1928, and is directed to the process of lubricating textile yarns disclosed therein.

10 An object of my invention is to provide a lubricating fluid for textile yarns which is easily and economically applied and readily removed.

Further objects of my invention will appear from the following detailed description.

The lubrication of yarns, particularly those made of or containing organic derivatives of cellulose presents serious difficulties since the ordinary lubricants employed presents various disadvantages when applied to such yarn.

25 In accordance with my invention, I prepare a lubricating fluid which contains a high boiling polyhydric alcohol or a high boiling ether of such alcohol. The lubricating fluid may contain some water, but such water is not absolutely necessary.

Of the high boiling polyhydric alcohols that may be used in the lubricating fluid, the following may be mentioned: glycerol (boiling point 290° C.); ethylene glycol (boiling point 197.5° C.); diethylene glycol (boiling point 250° C.); propylene glycol, etc. Of the ethers of polyhydric alcohols, the mono ethers such as the mono ethyl ether of ethylene glycol (boiling point 135.5° C.) or the mono ethyl ether of diethylene glycol, (boiling point 187.5° C.), and the diethers, such as the diethyl ether of diethylene glycol, may be mentioned. Obviously instead of using only one of the above polyhydric alcohols or their ethers, a mixture of two or more of these may be used. In general a liquid whose boiling point is above 100° C. should be used.

While glycerol may be used in the lubricating liquid, the glycols or their ethers are preferred, since glycerol has the objectionable property of leaving sticky deposits on the apparatus, with which the treated yarn comes

in contact, such as cap-edges, fliers, travellers, etc., whereas the glycols or their ethers do not behave in this manner.

Since many of the polyhydric alcohols and their ethers are hygroscopic, I prefer to add sufficient water to the fluid to bring the aqueous concentration to at least that of the maximum amount of water these alcohols or ethers tend to absorb from the atmosphere, in order to prevent change of volume, viscosity and concentration of the lubricating fluid. Thus glycerol absorbs water to the extent of 33% of its original weight from the air, ethylene glycol absorbs 3 to 4% and diethylene glycol 30% of water, and therefore when either of these liquids are used, I prefer to add water corresponding to the respective percentages set forth.

The lubricating fluid is applied by any of the usual methods for applying lubricating fluids to yarns, but I prefer to apply the same by causing the yarn that is being wound, spun, etc., to pass across a wick or pad that is dipping in or otherwise contacting with, the lubricating fluid, since this method is most economical and involves the use of a very compact tinting fluid apparatus that may be applied to all textile machines without difficulty.

Because of the high boiling point of the liquids used in the lubricating fluid and because of the other properties of these liquids, the wicks or pads have a very long life, running into several hundred hours, since the rate of evaporation of the solvents at normal temperature is practically nil, and thus the wicks or pads do not become clogged with solid material.

The liquids used in the lubricating fluids possess excellent lubrication properties because of their comparatively high viscosity and oiliness. Therefore, I have found that when the lubricating fluids herein described are applied to yarns, further lubrication with oils, etc. is unnecessary in such cases as for example, hanking, back-winding, ring-twisting, etc. of yarns of rayon or silk. In this connection it is pointed out that the lubricating value of ethylene glycol and diethylene glycol is greater than that of glycerol.

An important application of my invention is the lubrication of artificial yarns or filaments during the process of their manufacture and prior to their being wound. For instance, in the manufacture of cellulose acetate yarn by the dry spinning process, a solution of cellulose acetate in appropriate volatile solvents such as acetone, is passed through the orifices of a spinneret in a metier or dry spinning machine into a heated atmosphere, and the filaments thus formed are drawn and wound and/or twisted onto an appropriate bobbin or cap spinning machine.

When my invention is used in connection with a dry spinning process, the lubricating fluid is applied to the filaments or yarns on the metier or spinning machine. In one application of my invention, the lubricating liquid is applied by means of a wick, which is dipping in a trough containing the tinting fluid, to the filaments just after their exit from the metier casing, both the wick and the trough being mounted on the metier or dry spinning machine.

Because of the elevated temperature prevailing within the metier, the use of the high boiling solvents mentioned above in the tinting fluid is particularly advantageous in reducing the amount of clogging of the wicks. Since glycerol tends to leave sticky deposits, the glycols or their ethers which do not behave in this manner are preferred. Thus by the use of a tinting fluid containing diethylene glycol, I have found it possible to lubricate cellulose acetate yarns just after their formation and prior to their being wound and/or twisted, at the metier for 100 hours, without having to remove the wicks.

The yarns that may be lubricated in accordance with my invention may be of any nature. While this invention presents great advantages in the lubrication of yarns containing organic derivatives of cellulose, such as cellulose acetate, cellulose formate, cellulose propionate and cellulose butyrate, ethyl cellulose, methyl cellulose or benzyl cellulose, it may be applied to yarns of other fibres such as silk, wool, cotton, reconstituted cellulose (rayon) flax or composite yarns containing mixtures of these.

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

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

1. Process of rendering textile yarns of organic derivatives of cellulose more suitable for textile operations which comprises lubricating said yarns prior to their formation into fabric with a fluid containing a substance selected from the group consisting of glycols and alkyl ethers of glycols.

2. Process of rendering textile yarns of organic derivatives of cellulose more suitable for textile operations which comprises lubricating said yarns prior to their formation into fabric with a fluid containing a substance selected from a group consisting of diethylene glycol and alkyl substitution products of diethylene glycol.

3. Process of rendering textile yarns of organic derivatives of cellulose more suitable for textile operations which comprises lubricating said yarns prior to their formation into fabrics with a fluid containing a liquid polyhydric alcohol, wherein at least one hydroxyl hydrogen is replaced by alkyl groups, and water in amount equal to that which the polyhydric alcohol compound will absorb from the atmosphere.

4. Process of rendering cellulose acetate textile yarns more suitable for textile operations which comprises lubricating said yarns prior to their formation into fabrics with a fluid containing a liquid polyhydric alcohol wherein one or more of the hydroxyl hydrogens is replaced by alkyl groups.

5. Process of rendering cellulose acetate textile yarns more suitable for textile operations which comprises lubricating said yarns prior to their formation into fabrics with a fluid containing a substance selected from a group consisting of diethylene glycol and alkyl substitution products of diethylene glycol.

6. Process of rendering cellulose acetate textile yarns more suitable for textile operations which comprises lubricating said yarns prior to their formation into fabrics with a fluid containing a liquid polyhydric alcohol, wherein at least one hydroxyl hydrogen is replaced by an alkyl group, and water in amount equal to that which the polyhydric alcohol compound will absorb from the atmosphere.

In testimony whereof, I have hereunto subscribed my name.

WILLIAM WHITEHEAD.

CERTIFICATE OF CORRECTION.**Patent No. 1,852,891.****Granted April 5, 1932, to****WILLIAM WHITEHEAD.**

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, line 77, for the word "tinting" read lubricating, and line 89, before "liquids" insert the word organic; page 2, line 33, for "tinting" read lubricating, and line 65, claim 1, for "an" read and; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 14th day of June, A. D. 1932.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.