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PRODUCT FOR INCREASING THE SLIP OF TEXTILE MATERIALS

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This invention relates to a new product to be used for increasing the facility of slip of textile material.

Products of this class are employed to facilitate the mechanical working of textile material and to preserve the latter from injury during working. If no slip-producing agent or lubricant is used, the mechanical working of such material, particularly wool and artificial silk as well as cultivated silk and nettle fiber, causes considerable losses. In case of wool, it has been found profitable to facilitate working from the scoured raw wool up to the top and finished yarn by the addition of slip-increasing agents or lubricants which, in working artificial silk, serve also for keeping the filaments closed. Individual filaments possess a high degree of resistance to working and break easily on account of their fineness, whereas closed filaments, particularly if closed by a lubricant, can be worked without trouble and without much waste.

The lubricants hitherto in use include, above all, fatty oils, such as linseed oil, castor oil, arachis oil, and the like, either in normal condition or aqueous emulsion; mineral oil, vaseline oil, train oil, and the like, have been proposed also. The first-mentioned oils tend to resinify by oxidation, a process commonly referred to as drying, or to become rancid and thus have an adhesive effect which renders working difficult, or to acquire an unpleasant odor difficult to remove, and the other oils, besides possessing an unpleasant odor, are open to the serious objection that they can be removed from the textile materials only with great difficulty. Furthermore, although all these substances facilitate gliding to a satisfactory degree, they require high concentration, owing to their tendency to enter the material.

It is known to smooth and to close artificial silk with the aid of paraffin or waxes by passing the material over blocks thereof and thus cause it to take up some of their substance. It has further been proposed to employ emulsions of these substances, but it was found to be impossible to remove the agent applied to the material without the use of solvents, even in case of emulsions. For this reason, particularly in case of artificial silk, the smoothing medium was not removed but allowed to remain on the material with the result that the quality of the latter was considerably impaired, as the presence of a smoothing agent on the material will materially lower the heat insulating capacity thereof.

The invention aims at overcoming these defects and consists in producing emulsions from the paraffins and waxes known to be the best lubricants, which are not only durable but can be completely removed from the material. It was found absolutely necessary in the production of such emulsions to add a hydrophilic compound insoluble in water in addition to paraffin or like substances constituting a hydrophobic compound insoluble in water and acting as emulsifying agent. Although insoluble in water themselves, such compounds are nevertheless capable of dissolving water to a considerable degree. Both insoluble substances are then emulsified in an aqueous solution of a hydrophilic water soluble substance having an emulsifying effect. The facility of slip is considerably higher than if the same amount of paraffin or the like were used alone, since a high degree of hydrophily is attained involving constant slipperiness. This condition is known to arise when mineral oil and water meet and the facility of slip is suddenly increased. By producing hydrophily, it thus becomes possible to obtain not only highly stable and therefore easily removable lubricant emulsions, but, in addition, to increase the facility of slip to the degree of slipperiness which will be constantly maintained, owing to the hydrophily produced. Furthermore, during the working of textiles, and particularly during spinning, the rooms must be kept moist all the time to make working possible or to prevent loss and waste, but the use of lubricant emulsions according to the invention will increase the water absorbing capacity of textiles to such a degree that moistening can be reduced or dispensed with. This is of inestimable value, especially with respect to the life of the machinery.

Besides paraffins and waxes, other hydrophobic substances insoluble in water, such as fatty oils, e. g., olive oil, arachis oil and palm oil, or fats like tallow and japan wax or waxlike substances like spermacetic oil, deodorized blubber, spermaceti, and even mineral oils may be employed without fear of complications, as all these substances can be removed from the textiles by a simple washing out process.

As hydrophilic emulsifying agents insoluble in water serve compounds which polarly carry one or several hydrophilic groups, such as the hydroxyl group, the acid amide groups, the carbon amide and sulfamide group. As it were, such groups are related to water, turn towards water when brought together therewith, and have polar orientation. If such groups are chemically bound to a paraffinlike radical, these polar groups will be related to the hydrophobic group. The polar compounds can dissolve water and also paraffin and other hydrophobic substances, which explains why and how they can serve as emulsifiers. In the presence of these substances the permanence of such emulsions rises suddenly, which explains also why they can be washed out so easily. There are further products, particularly natural products, which constitute chemical mixtures and in which the hydrophobic substance insoluble in water is therefore mixed with the hydrophilic substance insoluble in water. A substance of this kind is for instance wool grease which has been divided already into cholesterin, which has a hydrophilic component, and into hydrophobic true fats like triglycerides. A similar mixture is obtained by alcoholysis when glycerin acts on triglycerides and monoglycerides and diglycerides are formed. The triglycerides possessing hydroxyl groups closed only by esterification are hydrophobic whereas the diglycerides and monoglycerides are hydrophilic, sometimes to such a degree that they become soluble in water, though more or less difficultly so. Compounds which are on the boundary between solubility and insolubility in water may also serve as emulsifiers, and the term 'hydrophilic insoluble in water" should therefore not be too strictly interpreted according to the invention, since it is intended to refer merely to the group of substances being on the boundary between insolubility and slight solubility in water. Compounds of this class are for instance the aliphatic alcohols and glycols having more than eight carbon atoms, e. g., decylic alcohol, dodecylic alcohol, tetradecylic alcohol, hexadecylic alcohol, octadecylic alcohol, eicosyl alcohol, octadecenylic alcohol, octadecandiol, and compounds like wool grease alcohol. Similar and useful compounds are the glycol and glycerine esters of the aliphatic carboxylic acids having more than eight carbon atoms like the already mentioned monoglycerides and diglycerides and the oleoylglycol ester. Likewise, aliphatic acid amides can be made use of, such as the carbon amides including stearyl amide, oleoyl amide, lauroylaminopropionoyl amide, propionoylaminopropionoylaminomethyl amide, and palmitoylethanol amide, and also the sulfamides comprising tetradecane sulfamide, hexadecanesulfoethanol amide, hexanesulfoaminoethanesulfo(methyl) amide, and octadecane-sulfacid-aminopropandiol.

As hydrophilic water soluble and emulsifying compounds serve, as a rule, salts, alkaline salts and those of salt-forming nitrogenous inorganic or organic bases of the aliphatic carboxylic acids and aliphatic sulfo-acids having eight or more carbon atoms, in so far as they possess emulsifying properties, e. g., the soaps: palmitic sodium or potassium, oleate of potash or oleate of sodium, lauric sodium or potassium, oleate and bioleate of ammonium, triethanol amine, sodium stearo-sulfonate, and pyridine lauro-sulfonate. Equally useful are the corresponding salts of the esters of sulfuric acid which are derived from the aliphatic alcohols having eight and more carbon atoms, such as the sodium salt of the ester of hexadecanol-sulfuric acid, the ammonium salt of the ester of octadecanol-sulfuric acid, the sodium salt of ricino-sulfacid, the diammonium salt of the ester of chloroctadecanolsulfo-sulfuric acid, the potassium or triethanolamine salt of the ester of octadecenoylmethylaminoethanol-sulfuric acid. Among the suitable salts of sulfacid are those of octadecenoylmethylaminoethane-sulfacid and hexadecanesulfaminoethane-sulfacid and the corresponding product methylated with sulfamide nitrogen.

With the aid of the substances mentioned by way of example an immense number of combinations including a hydrophobic plus a hydrophilic substance insoluble in water plus an emulsifying hydrophilic substance dissolved in water, all of which are adapted to increase the facility of slip of textiles.

Since these combinations represent not only new compositions of matter, but afford also novel and unforeseen advantages in use, protection is sought for the process also.

The following examples show the preparation of the new compositions of matter and the way they are used, though the scope of the invention is not limited to them.

Example 1

9 parts by weight of paraffin of a melting point of 40°-42° C. are melted together with 7 parts by weight of commercial hexadecanol (cetylic alcohol) of an unsharp melting point of 40° C. This mixture is stirred up at approximately 50° C. with 70 parts water in which previously 3 parts by weight of sodium tetradecanolsulfate have been dissolved. The emulsion forms instantaneously, and stirring up is continued until cooling. The emulsion has a pure white appearance, remains stable for any length of time, and can be diluted with water within wide limits. With soap solution, it is capable of unlimited dilution, if the soap content is not too low.

Instead of paraffin, waxes like beeswax or Montan wax or mineral oil or spermaceti may be used.

Example 2

33 parts by weight of olein are saponified with 1467 parts by weight water, to which previously 10 parts by weight of 50 per cent. potash lye have been added, at 40°–60° C. At the same temperature, 30 parts by weight of olein alcohol mixed with 60 parts by weight of paraffin of a melting point of 40°–42° C. are added in molten condition to this mass, and then stirring up is continued until the mass is cooled.

Part of the paraffin can be replaced by olive oil, spermaceti oil or mineral oil of about 170° C. flashing point. When mineral oil is used, stirring before use is advisable, as sometimes a few drops of oil will settle on the surface of the emulsion. Instead of olein alcohol, olein amide (12 parts by weight) or the same quantity of laurin alcohol or ethal of a melting point of 20°–23° C. may be used.

Example 3

10 parts by weight of paraffin flakes and 10 parts by weight of technical finely crystalline spermaceti are fused with 10 parts by weight of wool grease alcohol obtained from grease by fusing with a high percent soda lye. The fused mass is added in a thin jet to a solution, heated to 60° C., of 5 parts by weight of sodium octadecenoylmethylaminoethanesulfonate in 150 parts of water.

The wool grease alcohol can be advantageously replaced in this formula by one of the aliphatic alcohols mentioned or by an amide, e. g., oleoylaminoethanol.

Example 4

After scouring, wool is saturated with the lubricant prepared according to Example 1 at the rate of 5 parts by weight of the lubricant to 1 kilo wool, possibly by means of a spraying device. Then combing takes place as usual, the comber waste being 10% to 20% less than if arachis oil had been used.

Example 5

In working wool top into slubbing, the former is sprinkled with 0.6% of the lubricant described in Example 2, drafted in the slubbing department and spun say on ring frames. It has been observed that thread breakages were reduced 20% to 40% compared with material impregnated with 0.9% of an emulsion of arachis oil in bioleate of ammonium in water. Moreover, the textile material holds hygroscopically about 50% more water, so that moistening can be wholly or partly dispensed with.

Example 6

Before reaching the slubbing department, woolen top passes through three troughs disposed one behind the other and containing 3 to 5% of an emulsion of

	Kilograms
Ethal, solid	15
Ethal, liquid	15
Olein	33
50 per cent potash lye	10
Soft paraffin	60
Water	1467

The top is thoroughly squeezed out by rollers, and other heatable rollers then remove most of the excess moisture. The top is then conveyed to the slubbing department where it is drafted and spun in the usual way. Thread breakage is reduced to about 50%–70%, and the material obtained possesses furthermore a degree of elasticity which is about 25% higher than in wool tops impregnated according to the process stated in the preceding example with an aqueous emulsion of arachis oil in bioleate of ammonium. The behavior of the material with respect to dyeing will not be affected by the application of the lubricant.

Example 7

Artificial silk is treated with an emulsion of paraffin, cetyl alcohol, linseed oil, and soap prepared according to Example 2. The filament will close up, and spinning takes place as usual, but the results will be approximately 10%–15% higher. Furthermore, the lubricant can be completely removed from the material and the spun product dyed without any risk of failure and waste. In addition, the material possesses a much greater heat insulating capacity.

The term "paraffin", as used in the appended claims, is to be understood as including any essentially paraffinlike substance performing the functions of paraffin in the compound as claimed. Numerous examples of equivalent materials have been given above.

We claim:—

1. A new product for increasing the facility of slip of textile material, consisting of an emulsion of paraffin, said paraffin having hydrophobic and slip producing properties and further being insoluble in water; a hydrophilic polar substance insoluble in water having an alkyl radical of at least 10 carbon atoms and a hydrophilic group chosen from the group of radicals which consists of the hydroxyl, the acid amide, the sulphamide and the carbamide radicals; and a hydrophilic water soluble polar compound comprising a salt of an organic acid having emulsifying properties and carrying an alkyl group having at least 10 carbon atoms as paraffinlike pole and an acid group characterized by solubility in water.

2. A new product for increasing the facility of slip of textile material, consisting of an emulsion of paraffin, said paraffin having hydrophobic and slip producing properties and further being insoluble in water, an aliphatic acid amide whose alkyl radical contains at least 10 carbon atoms and whose acid amide nitrogen carries at least 1 hydrogen atom in direct combination, said amide having hydrophilic polar properties and being insoluble in water; and a hydrophilic water soluble polar compound comprising a salt of an organic acid having emulsifying properties and carrying an alkyl group having at least 10 carbon atoms as paraffinlike pole and an acid group characterized by solubility in water.

3. A new product for increasing the facility of slip of textile material consisting of an emulsion of paraffin, said paraffin having hydrophobic and slip producing properties and further being insoluble in water; a hydrophilic polar substance insoluble in water carrying an alkyl radical having at least 10 carbon atoms and a hydrophilic group; and a hydrophilic water soluble polar compound having emulsifying properties and comprising the salt of a sulphuric acid ester of an aliphatic alcohol having at least 10 carbon atoms.

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DISCLAIMER

2,100,845.—*Ehrhart Franz*, Leipzig, and *Max Hardtmann*, Naunhof, near Leipzig, Germany. PRODUCT FOR INCREASING THE SLIP OF TEXTILE MATERIALS. Patent dated November 30, 1937. Disclaimer filed February 7, 1941, by the assignee, *American Hyalsol Corporation.*

Hereby enters this disclaimer to claim 3 in said specification, and to that portion of claim 1 in which the hydrophilic group is chosen from the group of radicals which consists of the hydroxyl and specifically by disclaiming the words "the hydroxyl" which appear on page 3, second column, line 18 of said Letters Patent.

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