COMPOSITIONS FOR USE IN STEAM IRONING AND PRESSING

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5 Claims. (Cl. 38—144)

This invention relates to a new and improved composition for use in the steaming of textiles in conjunction with a pressing or ironing operation.

This application is a continuation-in-part of the copending application of LeRoy B. Edwards, Ser. No. 301,155, filed on July 26, 1952, and entitled "Method of Improving Characteristics of Cloth and Rendering Same Water Repellent During Steaming" and the copending application of LeRoy B. Edwards et al., Ser. No. 328,354, filed on December 29, 1952, and entitled "Method for Steam Ironing and Apparatus and Materials for Use in Same."

In the copending application Ser. No. 328,354, description is made of a steam pressing iron and materials and apparatus for use with some wherein a liquid lubricant is incorporated in amounts ranging from about 0.0001 to 0.1 percent by weight in the aqueous medium for volatilization therewith in a flash type iron to pass with the steam into the fabric being ironed to improve the quality and the characteristics of the goods. Instead of incorporating the lubricant or textile finishing oils with the water or other aqueous medium, description is also made of an iron formed with a vaporizing chamber located in the path of the generated steam wherein a liquid lubricant is contained in position to be contacted with the steam during passage therethrough with the result that sufficient lubricant becomes volatized or otherwise entrained with the steam for passage therewith into the fabric to improve the body and finish thereof while at the same time greatly easing the ironing operation.

It is an object of this invention to provide new and improved compositions for use in steam pressing irons of the type described.

Another object is to provide new and improved compositions for use without further dilution in a steam pressing iron to improve the body and finish of the fabric during the ironing operation and it is a related object to provide a concentrate capable of dilution in aqueous medium to the desired concentration for use in a steam ironing operation of the type described.

A further object is to provide a lubricant concentrate for use in steam irons of the type described for entrainment in desired amounts with the steam for passage with the steam into the fabric being pressed or ironed to improve the body and finish thereof.

In accordance with the practice of this invention, vast improvement results in the use of a steam iron of the type described in which the aqueous medium adapted to be converted into the steam and vaporized contains a textile lubricant in amounts of about 0.0001 to 0.1 percent by weight comprising a lubricant such as mineral oil and other textile oils in combination with an organo-silicon compound such as a silane having from 1 to 3 hydrolysable groups preferably in the form of short chained oxy groups, a stable silanol, or preferably a polysiloxane such as a liquid polymer of the type dimethyl polysiloxane (D. C. 200 liquid), diethyl polysiloxane (D. C. 400 liquid), laurel polysiloxane and the like, or a polysiloxane copolymer of the type methyl, ethyl and methyl ethyl polysiloxane, phenyl methyl, phenyl and methyl polysiloxanes and the like. When present in combination, it is preferred to maintain the ratio of ingredients within the range of 10:50 parts by weight of the organo-silicon compound to 50:90 parts by weight of the lubricant. When the organo-silicon is present in the form of a polysiloxane fluid, a considerably higher ratio of the polysiloxane may be used to the extent that the polysiloxane liquid may be used exclusively to achieve the desired results. These same concepts are applicable in the use of the organo-silicon alone or in combination with the lubricants for introduction into the steam line of a pressing machine during the pressing operation so that it will be carried with the steam into the fabric being pressed to be deposited on the fibers to improve the body and finish thereof.

The desired concentration of lubricant and organo-silicon compound may be achieved by introducing the materials into the water as a concentrate in aqueous dispersion capable of unlimited dilution without instability at the desired concentration. Such concentrate may be used also for introducing the materials into the steam line of a pressing machine for admixture with the steam which carries the material into the fabric during the normal pressing operation to deposit the lubricating materials onto the fibers and improve the body and characteristics thereof.

When introduced into the steam line, the rate should be controlled to provide the desired dilution when calculated on the basis of the water of which the steam is formed. Such concentrate for introducing into the steam line or for admixture with the water in the pressing iron should contain the materials in the desired ratio and preferably in concentrations of about 10—60 percent by weight depending upon the use to be made thereof. For introduction into steam where the control as to such small ratios of addition is difficult, it is more expedient to make use of concentrates having lower solids content, such as from 1—20 percent by weight.

These same concentrates may also be used for wetting porous packings introduced in the path of the steam during passage to the sole plate of the iron or to the buck of the pressing machine whereby the fiber treating substances including the organo-silicon, alone or in combination with the lubricant, are carried in the desired concentration with the steam into the fabric to improve the body and finish thereof. The amount of concentrate used in this manner should be calculated on the solids basis for conditioning from 1000 to 8000 square yards of material per one pint, it being understood that the amount will vary in accordance with the type of operator, type of iron and pressing machine and the characteristics of the goods being ironed.

The organo-silicon materials have been found materially to enhance the characteristics of the goods and markedly to improve the feel and the hand thereof as well as impart some degree of water repellency thereto. Thus it is desirable, whenever possible, to make use of higher concentrations of the organo-silicon compounds in the treating compositions and it is preferred, where possible, to make use of a composition composed almost entirely of the organo-silicon fluids and the lubricating components.

The following will provide illustrations of the various compositions embodying features of this invention for use in steam irons to improve the ironing operation and the characteristics of the goods being ironed:

Example 1

<table>
<thead>
<tr>
<th>Percentage by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00025</td>
</tr>
<tr>
<td>0.00075</td>
</tr>
<tr>
<td>0.5</td>
</tr>
<tr>
<td>99.49925</td>
</tr>
</tbody>
</table>
The above composition may be used directly in a steam iron, preferably of the flash type, for volatilization in the required amounts for generating vapors to be carried through the sole plate and introduced into the fabric during the ironing operation.

Example 2
10.0 percent by weight diethyl polysiloxane fluid
20.0 percent by weight mineral oil
1.0 percent by weight emulsifying agent
69.0 percent by weight water

The materials are formed into a dispersion which may be used as a concentrate for dilution with the required amounts of water to form a mixture having the desired concentration for use in a steam iron or the concentration may be introduced in small increments into the steam line of a pressing machine whereby the materials become entrained with the steam as fine particles or as vapors and are carried with the steam during the pressing operation into the textile material being pressed so that the lubricating materials are deposited on the fibers to improve the body and finish thereof. The above concentrate may also be used to impregnate a porous packing positioned in the path of the steam during passage to the material being ironed or pressed for entrapment of the lubricant into the steam whereby it is carried to the fabric being ironed and deposited on the fibers.

Example 3
15.0 percent by weight polysiloxane liquid
5.0 percent by weight sulphated lubricating oil
0.5 percent by weight emulsifying agent
79.5 percent by weight water

The concentrate of Example 3 may be used in the manner described in connection with that of Example 2. When a water soluble lubricant is used, such as the types described in the aforementioned copending application, the organo-silicon may be incorporated in the desired ratio in aqueous dispersion but it will be preferred to make use of a water soluble organo-silicon compound such as a water soluble polysiloxanolate of the type ammonium di-methyl polysiloxanolate, sodium ethyl methyl polysiloxanolate or silanes stable in aqueous medium, such as a silanol having stabilizing aromatic groups attached directly to the silicon atom, such as diphenyl silane diol, diphenyl silane diol and the like, or in which ammonium hydroxide, sodium hydroxide or other base formed of a strong base and weak acid is present to adjust the aqueous composition to a pH between 5 and 9 whereby the silane, its silanol or polysiloxane is maintained in a soluble state in the aqueous medium, or in which the silane preferably in the form having hydrolyzable oxo groups instead of halogen groups is dissolved in solvent solution in amounts up to 10–30 percent by weight and then dispersed from solution in aqueous medium to achieve a high degree of separation between molecules and prevent hydrolysis and polymerization into unstable polymers until carried by the steam into the fabric during the ironing operation.

It will be understood that changes may be made with respect to the materials, their manner of incorporation, and that such materials may be used with the various steam ironing and pressing devices without departing from the spirit of the invention, especially as defined in the following claims.

We claim:
1. In the method of ironing and pressing with steam, the steps of introducing as the steam generating material an aqueous composition containing about 0.0001 to 0.1 percent by weight of a lubricating composition consisting essentially of a textile lubricating oil and a liquid organo-silicon polymer having two hydrocarbon radicals substituted on the silicon atoms in which the hydrocarbons are alkyl groups containing 1–12 carbon atoms and present in the ratio of 10–50 parts by weight of the organo-silicon compound to 50–90 parts by weight of the oil wherein the oil and organo-silicon become uniformly distributed throughout the steam, and causing the vapor generated to be introduced into the textile material during the pressing and ironing operation whereby the oil and polysiloxane are carried with the steam into the fabric being processed and deposited on the fibers to improve the body and finish thereof.
2. In the method of ironing and pressing with steam, the steps of introducing a liquid consisting essentially of a textile lubricating oil and a liquid polysiloxane having two hydrocarbon radicals substituted on the silicon atoms in which the hydrocarbons are alkyl groups containing 1–12 carbon atoms and in which the materials are present in the ratio of 10–50 parts by weight of polysiloxane to 50–90 parts by weight of the oil into the steam line of a pressing machine in amounts to provide a concentration of 0.0001 to 0.1 percent by weight lubricant based upon the amount of water that is contained in the steam where by the oil and polysiloxane become uniformly dispersed in the steam, causing the vapor generated to be introduced into the textile material during the pressing and ironing operation whereby the particles of oil and polysiloxane are carried with the steam into the fabric being processed and deposited on the fibers to improve the body and finish thereof.
3. A composition for use in steam irons and pressing machines comprising an aqueous composition containing about 0.0001 to 0.1 percent by weight of lubricating materials consisting essentially of an oil and a liquid polysiloxane having two hydrocarbon radicals substituted on the silicon atoms in which the hydrocarbons are alkyl groups containing 1–12 carbon atoms and present in the ratio of 10–50 parts by weight of the polysiloxane to 50–90 parts by weight of the oil.
4. A composition for use in steam irons and pressing machines comprising an aqueous composition containing as a dispersed phase about 0.0001 to 0.1 percent by weight of lubricating materials consisting essentially of a mineral oil and a low molecular weight liquid polysiloxane having two hydrocarbon radicals substituted on the silicon atoms in which the hydrocarbons are alkyl groups containing 1–12 carbon atoms and in which the materials are present as a dispersed phase in the aqueous medium.
5. A composition for use in steam irons and pressing machines comprising an aqueous composition containing about 0.0001 to 0.1 percent by weight of a liquid organo-silicon polymer having two hydrocarbon radicals substituted on the silicon atoms in which the hydrocarbons are alkyl groups containing 1–12 carbon atoms and in which the materials are present as a dispersed phase in the aqueous medium.

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