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TREATED RAW-COTTON FIBER AND LUBRICANT AND CONDITIONER THEREFOR

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My invention relates to a process for the lubricating, conditioning and laying the fly of raw cotton prior to the spinning operations.

One object of my invention is to provide a process whereby the raw cotton stock will be lubricated and conditioned during the preliminary operations and whereby any static electricity that may be generated will be neutralized.

Another object is to provide a process which will lay the fly and the dust and prevent the accumulation thereof in the picker or card rooms or in subsequent operations.

A further object is to provide a process whereby the cotton stock is lubricated and conditioned without any discoloration or staining of the stock, which process will not involve corrosion of the machine parts, neither will it have any deleterious effect on the cotton in the later steps such as spinning, weaving, bleaching or dyeing nor will its use involve any fire hazard.

Heretofore, attempts have been made to lubricate, soften and condition raw cotton, prior to the carding and spinning, by the use of humidifiers, solutions of soap and water, mixtures of sulphonated vegetable oils, and pure mineral oils.

Humidification is at best only a temporary relief, for the water evaporates very rapidly and the stock is then left in its original condition. When soap solutions are used a hard, dry soap is left upon the raw cotton after the evaporation of the water. If the stock is treated with animal or vegetable oils or sulphonated animal or vegetable oils, there remains upon the stock after the evaporation of the water, a deleterious sticky gum. With the use of mineral oil, a difficulty is experienced in the bleaching and dyeing operations since the mineral oil will not scour out easily or completely. Furthermore, the use of mineral oil involves a high fire hazard and its use is accompanied by the rank burning odor of the oil.

My invention is characterized by an improved process for the conditioning, lubricating and laying the fly of raw cotton which has none of the above named disadvantages. When raw cotton is treated according to the process hereinafter fully described the cotton will remain soft and flexible throughout the subsequent processes. The cotton stock will not be stained as is the case when pure mineral oil is used, due probably to the precipitation of the minute carbon particles of the mineral oil upon the fibers caused by capillary attraction. With the use of the compound of the present invention, this is prevented due undoubtedly to the greater surface tension exerted by the non-mineral oil than by the cotton fibers. The efficiency of the dyeing and bleaching operations will not be impaired. No corrosion in the machine parts will result but contrary to this the cards will be rendered more efficient and the card wire and the flyer tubes on the roving frames will be brightened. When this process is carried out according to my preferred method of application, there will be no fire hazard accompanying the process but quite a contrary condition will be found for any tendency of spontaneous combustion or ignition of the cotton will be retarded. My process comprises the application of a mixture of mineral and non-mineral oil to the cotton fibers in the preliminary operations, that is to say in the operations prior to the spinning. The non-mineral oil may be of either a vegetable or an animal oil or a combination of both, for example olive oil and/or oleic acid have proved satisfactory with an admixture of mineral oil. The mineral oil may be any one of the different classes but it is desirable to use a bleached water-white variety. The use of this combination of oils causes the cotton to be opened up more readily and hence the staple or fiber length of the cotton is preserved. Furthermore, the use of the compound results in the rendering of the natural gum or the fibers in an emulsifiable condition, so that it is easily removed in subsequent operations.

The use of the simple mixture of mineral and non-mineral oils has many advantages over the prior practices in the mills, but if this mixture is to be used in its concentrated form it is often desirable to add an emulsifying agent to the mixture of oils so that in

the later stages in the finishing of the cotton, the conditioner and lubricator may be removed with comparative ease. By the use of an emulsifying agent with the oils, it is a simple matter to free the cotton from the oils in subsequent operations by adding water. Soluble soap is an example of a wide variety of materials which may be used for this purpose and the soap itself may be added to the mixture or it may be formed therein by a chemical reaction, for example the addition of a small amount of alkali will result in the formation of soap, the alkali reacting with a portion of the non-mineral oil.

The preferred application of the conditioner and lubricator to the raw cotton fibers is in the form of an emulsion, that is to say the cotton is treated during the preliminary operations with a stable emulsion of a mixture of mineral and non-mineral oils. This emulsion is prepared by adding an emulsifying agent such as soap to a mixture of mineral and non-mineral oils. Thereafter the requisite amount of water is added and the mixture is agitated to form the emulsion. As hereinbefore pointed out, the emulsifying agent may be added to the mixture or it may be formed therein by a chemical reaction. The use of the emulsion results in a process in which the conditioner and lubricator will have very high penetrating properties and in which there will be no fire hazard. The ratio of oil mixture to water may vary widely in the emulsion, but proferably it is used in the ratio of one to two parts of water to one part of the oleaginous mixture.

The presence of glycerine in the product is especially advantageous since this compound has hygroscopic and moisture attracting properties and thereby tends to absorb moisture and to decrease the evaporation of the water. I have also found that the presence of a sulphonated vegetable or animal oil is advantageous at times since it materially aids in the stabilization of the emulsion and adds materially to the conditioning and lubricating properties of the product. A formula which has proved to be especially satisfactory is as follows:

	Per cent
Olive oil	2
Sulphonated castor oil	2.2
Oleic acid	1.125
Glycerine	3.25
Soap	8.125
Mineral oil	82.25

These ingredients are thoroughly mixed and the product is then ready for use. As previously pointed out if it is to be applied in the form of an emulsion, it is agitated with one to two parts of water to one part of the oleaginous mixture.

The percentage of the ingredients may vary widely but the percentage of mineral oil in the oleaginous mixture should always be considerably in excess of the percentage of non-mineral oil. For example, another formula which may at times be used to advantage is as follows:

	Per cent
Mineral oil	70
Oleic acid	7
Sulphonated castor oil	10
Olive oil	2
Glycerine	5
Soap	6

The application of the lubricator or conditioner to the raw cotton stock as hereinbefore pointed out may be applied to the raw cotton stock during any of the preliminary operations, that is to say prior to the spinning operations. It is preferably added at a point in the operation where the cotton fibers are in a fibrous sheet or mass and early enough in the operation so that in the subsequent steps of picking or carding the fibers will be pulled over one another and thus the conditioner and lubricator will be uniformly distributed through the entire mass at the time it arrives at the spinning step. It may be added to the breaker or to any one of the pickers or even at the carding machines. I have found the most advantageous place of application to be at the pickers, as for example the intermediate picker. The oleaginous mixture or the emulsion is preferably applied to the raw fibers in a finely divided condition, such as spraying. If spraying is used, the spray can be produced by hand pressure, compressed air or by mechanical means. The oleaginous mixture or the emulsion can also be applied by a soaping apparatus. One type of soaping apparatus which may be used consists of a solid roll running in a pan of the mixture with a stiff-bristled brush in contact with the roll which brush throws the conditioner and lubricator from the surface of the roll onto the cotton fibers.

The percentage of lubricator and conditioner to be added to the raw cotton stock varies with the condition of the stock and the conditions of operation. Usually a very small amount, less than 1% will be sufficient to accomplish the results desired. However, at times and for certain work, as small a per cent as one-fourth of 1% based on the percentage of oil present is all that is required. In other cases, more than 1% may be used to advantage.

Considerable modification is possible in the method of applying the conditioner and lubricator to the raw stock and in the proportions of the ingredients in the lubricator and conditioner as well as in the percentage used, without departing from the spirit and scope of my invention.

I claim:

1. Lubricated and conditioned raw cotton fibers having distributed thereon a water-emulsion of mineral oil, non-mineral oil, soap,

sulphonated vegetable oil, and glycerine, the emulsion containing at least 50% of water, the mineral oil being present in amounts (excluding the water) greater than 60%, the soap in excess of 5%, the glycerine in excess of 2%, and the balance being non-mineral oil.

2. Lubricated and conditioned raw cotton fibers having distributed thereon a water-emulsion of mineral oil, oleic acid, olive oil, soap, sulphonated castor oil, and glycerine, the emulsion containing at least 50% water, the other ingredients being present in approximately the following percentages, excluding the water, mineral oil 70%, oleic acid 7%, sulphonated castor oil 10%, olive oil 2%, glycerine 5%, and soap 6%.

3. A lubricant and conditioner for raw cotton fibers comprising a water-emulsion of mineral and non-mineral oil, the emulsion containing at least 50% water, and the other ingredients exclusive of the water being present in the following percentages, mineral oil more than 60%, soap more than 5%, glycerine more than 2%, the balance being non-mineral oil.

4. A lubricant and conditioner for raw cotton fibers comprising a water-emulsion of mineral and non-mineral oil, the emulsion containing at least 50% water, and the other ingredients exclusive of the water being present in approximately the following proportions, mineral oil 70%, oleic acid 7%, sulphonated castor oil 10%, olive oil 2%, glycerine 5%, and soap 6%.

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