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2,876,141

ANTI-SOILING TREATMENT OF CARPET AND RUG BACKING YARNS AND FIBERS

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No Drawing. Application November 5, 1956
Serial No. 620,196

2 Claims. (Cl. 117—139.5)

The present invention is directed primarily to the treatment of spun carpet backing yarns or base fibers with an anti-soiling solution to prevent migration of mineral oil and other soiling accelerants from such yarns or fibers and thus avoid soiling of the face yarn by reason of oil wicking producing dirt deposit.

In the manufacture of pile fabrics, such, for example, as floor coverings of the woven type, a special effort is usually made to insure that the finished fabric will be as soil resistant as possible. While this problem is not too serious in the case of woolen floor coverings, the prevalent use of rayon and other fibers of a specific type has created new and substantial soiling problems.

Upon first consideration it was believed that soiling of the face yarn of floor coverings was due to some factor inherent in its composition. In the process of spinning yarns as generally practiced, spinning oils, such as a mineral oil of paraffin base, have been generally used. In these cases some of the spinning oil is washed out during the dyeing process, especially in the instances of yarns which required the oil only to facilitate the spinning process, or yarns which do not need oil to maintain flexibility, and where harshness can be avoided without addition of oils or waxes. In yarns such as cotton, jute, rayon, hemp, and flax too, the complete absence of an oil emulsion will seriously reduce production in the spinning process.

Hitherto efforts have been made to reduce, or even eliminate, the oil content in the spinning of jute yarn for carpet backing. Even where the amount of oil employed has been substantially reduced, it has been found that a quite small but definite amount will wick into the face fibers of carpet and rug yarns. Entire elimination of the use of oil in such spinning was found to be impractical due to the extreme difficulty encountered.

Jute yarn is used very extensively in the floor covering industry. In Wilton, valvet and chenille carpets it is used for the weft yarn, backing yarn, and in many cases for stuffer warp. In Axminster and modified Axminster carpets or rugs it finds its primary use as weft material. In tufted rugs and carpets, jute is used primarily as base cloth into which the face tufts are punched in the manner a sewing machine would sew threads onto a fabric. Novelty fabrics employ jute for weft, filler, and, in limited cases, as binder. In a relatively few instances jute is used as face yarn.

While the disclosure of this invention will deal primarily with jute as the yarn to be treated, it is to be understood that the invention is not thus limited to the particular material, but may be utilized for treatment of most other known textile yarns.

It is therefore the primary object of this invention to provide a spun textile backing yarn that is so treated as to eliminate wicking of oil into the face fibers of the carpet or rug and thereby prevent soiling at a rapid rate.

A still further inventive purpose is to provide a process of treating jute backing yarn or the like with a wax-type

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softener that acts to prevent migration of mineral oil from the backing yarn to the face yarn fibers.

In the accomplishment of the primary object of the invention it was discovered that through the use of a particular wax-type softener adapted to retain the mineral oil in the yarn spun therewith to an extent such that oil-wicking migration is prevented to the extent that soiling of face yarn fibers can be avoided.

A further objective of the invention resides in the provision of an anti-oil wicking yarn softener of anionic or cationic character for treatment of carpet backing yarns.

Another and specific object of the invention resides in the provision of a jute spinning solution embodying in addition to mineral oil and an oil soiling prevention ingredient, emulsifying agent, humectant material, and soluble fungicides.

Another important object of the invention is to provide a soft surfaced floor covering having backing yarns that are so treated as to prevent oil wicking and thus minimize soiling of the pile surface yarn or fibers.

Another inventive aspect of the invention herein disclosed is the provision of a carpet backing yarn treated with a novel softener of an anti-oil soiling character as more fully described hereinafter.

The particular advantages and specific nature of this invention will be more fully understood from the following detailed description of a preferred embodiment and certain modifications thereof.

The base ingredient used in the treatment of jute or the like is mineral oil which has been made water soluble. The use of mineral oil by itself would result in a backing yarn that is too oily and one that would result in oil wicking and consequent soiling of the face yarn in use.

Hence the addition of a suitable emulsifying oil is a practical necessity. In order to assist in retaining moisture in the yarn itself a relatively small amount of humectant material is also added. Since yarns of the character involved are subject to fungi it is very convenient and desirable also to provide a treating solution which includes a fungicide and, preferably, both water soluble and oil soluble fungicides. The use of a wax-type cationic or anionic type material for carpet backing yarn softening and lubricating is essential to achievement of an anti-oil wicking property.

A preferred embodiment of the composition of this invention is as follows:

Example

26 gallons of mineral oil, e. g., paraffin base having a viscosity of 100 Saybolt seconds
6 gallons of emulsifying agent, e. g., base cordage oil
2 gallons of humectant, e. g., oleic acid
40 gallons of textile yarn softener, e. g., a salt of amino organic type produced by Ciba and sold commercially as "Sapamine," a cationic wetting agent composed of trimethyl-B-oleamido-ethyl ammonium sulfate (Bennett's Concise Chemical and Technical Dictionary)
3 pounds of oil soluble fungicide, e. g., ortho-phenylphenol
9 pounds of water soluble fungicide, e. g., sodium salt of pentachlorophenol
Additionally there may be added as required dyeing material for jute or similar yarn, e. g., one part (by volume) of finely powdered mineral dye to two parts of oleic acid.

The composition of "base cordage oil" as used herein is as follows:

16% of soda soap of rosin acids and of oleic acid in equal proportions.
19% of potash soap of fatty acids from mustard seed oil.
10% of free rosin and oleic acid.

20% glycerin fatty acid esters, namely, a mixture of glycerin mono-di, and tri-esters of the fatty acids present in mustard seed oil, of which a typical analysis of the fatty acids present is:

2% palmitic acid
2% lignoceric acid
24% oleic acid
50% erucic acid
20% linoleic acid
2% linolenic acid

5% naphthenic-type mineral oil having a Saybolt viscosity of approximately 100 seconds at 100° F.

17% glycol type solvents, namely, diethylene glycol and 2-methyl 2,4-pentanediol in approximately equal proportions.

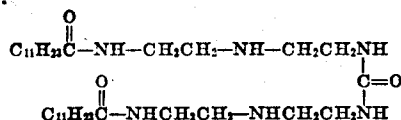
NOTE.—The fatty acid used in the "base cordage oil" is based on commercial oleic acid, commonly known as red oil. Wood rosin is the source of the rosin acids.

In the above example other commercially available humectants may be used.

Either an anionic or a non-electrolytic (non-ionic) yarn softener may replace the "Sapamine" set forth in the foregoing example. A suitable anionic softener is produced by Arnold Hoffman & Co., Inc. and sold commercially as "Ahcovel R"; and an alternative cationic softener termed "Ahcovel A" is also sold commercially by the same company.

"Ahcovel A" is produced in the following manner, as set forth in Examples 5 and 6 of Morgan et al. Patent 2,304,113 of Arnold Hoffman & Co., Inc.

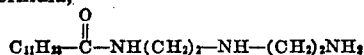
The lauric acid condensate described by the following formula:



and the salt formed with one molecule of acetic acid are soft, semiliquid, water soluble, greasy materials which applied as aqueous solutions containing 2 to 10 lbs. in 50 gallons of water give yarns which are highly softened and lubricated and which operate through the usual spinning operations vary satisfactorily. These products are mixed with an equal amount of mineral oil or a vegetable oil, such as, olive oil which they readily emulsify in water and the mixture is applied at 2-10 lbs. in 50 gallons to yarns and fabric as a softener and lubricant.

"Ahcovel R" is produced in the following manner, as set forth in Examples 4 and 5 of Morgan et al. Patent 2,344,259 of Arnold Hoffman & Co., Inc.

By reacting 57 parts (2 mols) of a polyalkyl amino acid amide of formula,



with 12 parts (2 mols) of urea, it is possible to secure a product which is completely heat resistant and does not show any yellowing tendency under hot ironing of treated cloths. The semi-liquid condensate at room temperatures made in this way can be reacted with 121 parts (2 mols) of monoethanolamine to yield a water-soluble compound. The product may be used at suitable strengths, such as, 5 or 10% for the lubrication of rayon and cotton yarns. For such purposes it is found to be very satisfactory as it permits the easy flow of the yarns in the machines in the twisting and combing operations and at the same time prevents any development of static during these operations. The yarns also show a very nice, pleasing, soft handle and in the case of colored yarns the fading resistance is unaffected by the use of this lubricant.

In compounding the spinning solution the mineral oil is first mixed with the emulsifying agent to render it water soluble. The oil soluble fungicide is then added and dispersed in the previous mixture until a proper solution is attained. Thereafter water is added very slowly to the oil and phenol mixture, the water being at a lukewarm tem-

perature of about 110° F. Concurrently some of the sodium salt of pentachlorophenol is dissolved by mixing with water and bringing the solution to the boiling point, after which it too is added to the mixture. The humectant material is then added while slow mixing continues. In the meantime another solution of the wax-type yarn softener has been prepared by dissolving said softener in water and bringing the solution to a boil. In so doing, the amount of the softener in pounds is dissolved in approximately one-half the amount in gallons of water. Mixing is continued until the thus formed solution is in a satisfactory condition for use as a spinning oil.

Because in many instances the jute or similar yarn cannot be used unless dyed, further treatment is required to modify an original color that would be unsatisfactory in the end product. Taking jute as a specific example, the procedure described above is the same except that before mixing the mineral oil with the emulsifying oil, a paste consisting of one part of powdered dyestuff to two parts of oleic acid is prepared. This paste is then mixed with the mineral oil and emulsifying oil.

In use the emulsion solution that has been described in detail is applied to the jute yarn or like yarn prior to spinning of the same and in a manner that produces at least a partial impregnation such as to render the spinning operation practical, and preferably sufficiently complete to insure full effectiveness of the properties of the fungicides and softener and the dyeing material.

It has been adequately demonstrated that by such treatment of jute or like yarn soiling of the yarn face surface of floor coverings is substantially prevented and there is thus provided a soft surfaced floor covering of unique and highly acceptable character.

The present application is a continuation-in-part of Russell R. Matthews application Serial No. 543,011, filed October 26, 1955, and now abandoned.

Since modifications and variations may be made in the details of the specifically disclosed embodiments of this invention without departing from the principles thereof, the scope of this invention is not intended to be limited other than as may be required by the appended claims.

Having thus described my invention, what I claim as novel and desire to secure by Letters Patent of the United States is:

1. The process of preventing soiling in use of carpet floor covering having face yarn subject to soiling as the result of oil wicking from oil treated yarn comprising the backing of such carpet floor covering, which process comprises applying to said backing yarn a solution consisting essentially of:

26 gallons of mineral oil;
6 gallons of "base cordage oil";
2 gallons of oleic acid; and
40 gallons of a cationic wetting agent composed of trimethyl-B-oleamido-ethyl ammonium sulfate.

2. A soft pile surfaced floor covering having backing yarn of jute containing a composition consisting essentially of:

26 gallons of mineral oil;
6 gallons of "base cordage oil";
2 gallons of oleic acid; and
40 gallons of a cationic wetting agent composed of trimethyl-B-oleamido-ethyl ammonium sulfate.

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