

UNITED STATES PATENT OFFICE

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PROCESS OF IMPREGNATING

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My invention is an improved process of impregnating particularly applicable to the production of a fast textile from a loosely woven fabric having yarns and fibres prevented from shedding or moving relatively to one another by partial impregnation of the fabric ground with an adherent material which firmly anchors the threads and fibres without detracting from the flexibility, feel or appearance of the fabric, and which by the practice of my invention avoids the necessity for the use of a vulcanizer, vulcanizing heat or solidification of the adherent material into a stiff or brittle substance.

My invention relates particularly to the manufacture of loosely woven pile fabrics, and especially those having an animal fibre V-pile anchored to the ground or backing by unvulcanized rubber deposited and coagulated in situ from an aqueous dispersion, either natural or artificial, partly permeating the backing. By my invention satisfactory anchorage of the pile may be effected without vulcanization and with the production of a fabric having a back substantially free from tackiness or objectionable adhesion and which retains substantially unimpaired the flexibility and feel of an untreated plush.

These desiderata are effected by so spreading an inherently tacky adherent material upon, and absorbing it part way into, the backing as to prevent the formation of a continuous or plane film of the anchoring material, which, in accordance with my invention, is broken up into minute areas by the pile bights projecting from the back. This minute subdivision of the otherwise somewhat tacky anchoring substance, and the protective projections formed by the protruding ends or points of the pile bights result in a back which is substantially tack-free and non-adherent in use. To neutralize the tendency of the fabric-finishing process to increase the tackiness of the unvulcanized rubber during such process, there is preferably incorporated in the anchoring material a waxy anti-tack which forms a "bloom" upon the surface of the unvulcanized rubber upon solidification thereof, such solidification being effected independently of the addition of the anti-tack. The anti-tack is used in such quantities that it does not coagulate the rubber or destroy the liquidity of the mix. The amount and effect of this anti-tack surface bloom is augmented by the process to which an impregnated fabric or other product is subjected after the application of the anchoring material thereto.

In the preferred practice of my invention, a V-pile fabric is loosely woven on the double plush principle from predyed ground yarns and undyed animal fibre pile yarns, such as mohair. The bights of the pile loops and the interlacing of the ground yarns form a back for each fabric having a relatively rough, dimpled or papuliferous surface with the points or ends of the pile bights preferably protruding slightly beyond the ground yarns.

The tendency of the tufts of loose pile in such fabric to shed from or move relatively to the ground yarns, and of the ground yarns to become displaced, is overcome by the application to the back of the fabric of a liquid aqueous compound containing rubber, which is solidifiable by heat, and a waxy substance which forms a substantially stable liquid emulsion with the aqueous compound and is liquefiable by heat to form a "bloom" upon the surface of the compound when the latter is coagulated and solidified. The solidified layer formed in the fabric is free from sulphur or other vulcanizing agents.

The liquid compound used has such viscosity relative to the porosity of the fabric backing as to cause the partial permeation of the compound into the backing without penetration through to the face thereof. The liquid compound is spread so thin that the portions thereof exposed on the back of the fabric are broken by the roughness of the surface thereof into minute areas, and the projecting bights from the pile tufts interrupt the continuity of the anchoring material, which would otherwise tend to form an adherent tacky plane film. By the thin spreading and absorption of the material, the formation of a continuous plane film is prevented and the treated back is substantially non-adherent in use due to the blooming of the waxy material to the surface as a result of its incompatibility with the rubber during and after solidification. The treated fabric is subjected to a moderate heat, preferably below that used for normal vulcanization of rubber, and the rubber is thereby coagulated in situ on the back of the fabric and the blooming of the waxy constituent is augmented by the capillary action of the pile bight structure tending to bring the waxy constituent through the interstices between the rubber particles. The fabric may then be scoured in a hot detergent bath and dyed in a hot acid dye bath, with continued exudation or blooming of the waxy anti-tack, so that the fabric may be scoured,

died, extracted, tigered and finished without shedding of the pile and without any adhesion of the fabric laminations together or to other objects.

5 The material, which I have found particularly advantageous for use in securing pile tufts without vulcanization, consists of latex having mixed therewith a wax emulsion and suitable anti-oxidants to form a liquid mixture. A desired degree
10 of viscosity of the mixture may be obtained by the incorporation therewith of a small amount of locust kernel gum solution.

In preparing the mixture, suitable wax, wax-like or resinous substances, with melting points
15 ranging roughly from 50° C. to 100° C., such as candelilla, montan or montana, carnauba, paraffin, chlorinated paraffin, ceresine, beeswax, glyceryl stearate, cumar, stearic acid, ozokerite, China wax, halowax, or spermaceti, may be liquified by heat and mixed with an acidic, oleaginous, resinous, or waxy material, such as stearic
20 acid, oleic acid, palmitic acid, abietic acid or the like. This mixture may be then emulsified with hot water containing an amino or alkaline material, such as tri-ethanolamine or caustic soda. Suitable anti-oxidants may be mixed with the emulsion, or with any of the ingredients thereof, and an intimate admixture of the ingredients and
25 uniform emulsification may be secured by running the emulsion through a colloid mill and thence to a cooling tank containing an agitator. Upon cooling, the emulsion forms a suspension having a paste-like consistency and may be added to latex or artificial aqueous rubber dispersions
30 in such proportion that the compound contains at least five per cent of non-rubber solids, which remain dispersed in the rubber without coagulation by the added materials.

When smoother backed fabric is treated, so
40 that the anchoring material tends to form surfaces of larger area, a larger percentage of wax is preferably used with the aqueous rubber so as to produce a heavier "bloom" of waxy anti-tack. When such liquid compositions are applied to a
45 loosely woven V-pile fabric, there results a pile fabric having a firmly anchored erect pile forming a face having good coverage and a nodulated back closely simulating untreated fabric which is

sufficiently free from tack, when coagulated without vulcanization, to be commercial for immediate use or for dyeing and finishing. The hot wet or hot dry processes involved in dyeing and finishing augment the liquefaction and blooming of the wax, and hence offset any increase in the tackiness of the rubber resulting from such operations.

Having described my invention, I claim:

1. In the manufacture of fast material from a
10 loosely woven pile fabric having pile forming bights on the back of said fabric and having a capillary action, the steps which consist in applying to said fabric a nonvulcanizing aqueous dispersion of rubber containing a non-tacky waxy
15 substance forming a bloom by the liquefaction of said substance, and the capillary action of said pile structure on said rubber when coagulated, and coagulating said rubber and further developing said bloom.

2. In the manufacture of fast material from a
20 loosely woven pile fabric having pile tufts forming bights on the back thereof, the steps which comprise applying to said fabric a composition containing a rubber substance solidifiable by heat
25 and a waxy substance liquifiable by heat, forcing said composition into said fabric so that the bights of the pile tufts interrupt the continuity of such composition, and subjecting said fabric with said compound therein to heat and thereby
30 solidifying said solidifiable substance and liquifying said liquifiable substance to form a bloom on said solidified substance.

3. In the manufacture of a fast textile from
35 a loosely woven pile fabric having a ground and pile loops interlaced to form a rough surface and protruding bights, the steps which consist in spreading on such surfaces and forcing into said
40 ground a liquid composition containing aqueous rubber and a heat liquefiable waxy substance, the continuity of such composition being interrupted by said pile bights, coagulating the rubber in
45 situ and augmenting the blooming of the waxy constituent through the interstices between the rubber particles by heat, and dyeing said fabric in a hot bath causing the continued exudation of said waxy substance.

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