

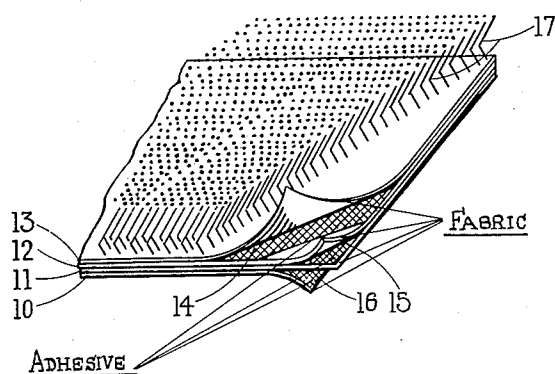
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CARD CLOTHING FOR TEXTILE MACHINERY

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CARD CLOTHING FOR TEXTILE
MACHINERY

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This invention relates to a material for brushing, combing or like purposes, in which material metal teeth, for example in the form of short metal wires, are fixed in a flexible or somewhat flexible support. More particularly the invention is concerned with the material known as card wire.

The card wire commonly employed in carding engines and also in certain other textile machines, for example certain fabric finishing machines, comprises a series of metal wire teeth suitably shaped and mounted in a flexible backing consisting of two or more layers of cotton fabric united by a vulcanized rubber adhesive. It frequently happens that it is required to subject textile materials, for example velvets, during finishing or other operations, not only to the combing or brushing action of the card wire, but also at the same time to the action of steam. In such case, however, it is frequently found that under the influence of the steam the metal of the card wire very rapidly corrodes and becomes entirely useless in a relatively short time. Such rapid corrosion may possibly be due to the development of acid, under the influence of steam, from the sulphur or sulphur compounds present in the rubber.

I have found that this defect of the existing card wire may be avoided by replacing the rubber in the flexible backing by a composition comprising an ester, ether or ether-ester of cellulose or of other polyhydroxy compound of high molecular weight, particularly polyvinyl alcohol, together with a plasticizer or softening agent for the same. In this manner a card wire may be produced which well resists the destructive action of steam, exhibited as aforesaid in the case of card wire into the construction of which rubber enters.

In accordance with the present invention, therefore, the metal teeth of card wire or like brushing or combing device for textile or other purposes are mounted in a backing or support comprising textile fabric or other fibrous material impregnated or coated with a composition containing an ester, ether, or ether-ester of cellulose or other high-molecular polyhydroxy compound, or in a backing or support comprising a composition containing an ester, ether or ether-ester of a high-molecular polyhydroxy compound as aforesaid and reinforced with textile threads, fibrous material, metal wire or other filamentary material.

The esters or ethers or ether-esters of the high-molecular polyhydroxy compounds may be, for instance, esters or ethers of cellulose, for example nitrocellulose, or organic esters or ethers of cellulose, for instance cellulose acetate, formate, pro-

pionate or butyrate, or ethyl or benzyl cellulose. Esters or ethers of other carbohydrates may likewise be employed, for instance products obtainable by esterification or etherification of starch. As indicated previously, esters or ethers or ether-esters of polyvinyl alcohol may likewise be employed, in some cases with great advantage, particularly where a backing of good flexibility is required. Such esters may be, for instance, the products obtainable by polymerizing organic or inorganic esters of vinyl alcohol, for example vinyl chloride, vinyl acetate or vinyl chloracetate. Further, there may be employed the products obtainable by esterifying and/or etherifying polyvinyl alcohol, for example with benzoic acid, phthalic acid or other organic carboxylic acids or mixtures thereof.

In order to give the cellulose or like ester or ether the flexibility desirable in the backing of card wire or like material, plasticizers or softening agents may be incorporated with the esters or ethers. Preferably such plasticizers should be relatively non-volatile or of low volatility in order that they may remain in the compositions and continue to impart plasticity thereto even after the prolonged action of moisture and heat. A wide range of plasticizers suitable for this purpose is available. In practice, particularly satisfactory results have been obtained by the use of the aryl esters of phosphoric acid, especially so where the impregnating material has as its basis nitrocellulose. As examples of such phosphoric esters mention may be made of triphenyl and tricresyl phosphates and mixed esters containing both phenyl and cresyl residues. Other plasticizers or softening agents which sufficiently resist volatilization may, however, be used, for example the crystalline condensation products of phenols or naphthols or their homologues or substitution products, e. g. chlor phenols, with ketones, the latter including both aliphatic ketones, e. g. acetone, and cyclic ketones, e. g. cyclo-hexanone, methyl cyclo-hexanone, cyclo-pentanone, cyclo-heptanone and other ketones of the cyclo paraffin series. As examples of such condensation products, mention may be made of diphenylol propane and other diphenylol or substituted diphenylol substitution products of methane hydrocarbons or substituted methane hydrocarbons, for example di-para-oxyphenyl-diphenyl-methane obtainable by the action of benzophenone dichloride on phenol.

The proportion of plasticizer or softening agent relative to that of the cellulose or polyvinyl ester or ether or the like may vary within wide limits.

A very satisfactorily flexible product may, however, be obtained with nitrocellulose by using tricresyl or triphenyl phosphate in the proportion of about 20 per cent. by weight. Smaller or larger proportions of plasticizer may, however, be used, for example as little as 10 per cent. or as much as 50 or even 100 per cent. or more, based on the weight of the cellulose or like ester or ether. Advantageously, the proportion of plasticizer may be on the high side where materials having a high degree of flexibility are required.

The cellulose ester or ether or like compositions may contain in addition to plasticizer any other desired ingredients, for example natural or artificial resins. Shellac or other natural resin may, for instance, be incorporated, or artificial resins such as may be formed by condensation of phenols with aldehydes and ketones. Such resins should not, however, be such as will harden under prolonged influence of steam, if it is desired that the backing of the card wire or like material should retain its initial flexibility.

For convenience in application to the textile fabric or fibrous material or metal wire forming the base of the support for the teeth of the card wire or the like, the cellulose ester or ether or like compositions may be made up in the first place with volatile solvents or solvent mixtures. For instance they may be prepared in the form of solutions made up with acetone in the case of nitro-cellulose or cellulose acetate or with other appropriate solvent in other cases. The solvents may be of high or low boiling point or may comprise both substances of high and substances of low boiling point. The presence of a proportion of volatile solvent of relatively high boiling point, for example a substance such as butyl acetate, frequently facilitates considerably the coating or impregnating of fabrics with the compositions. As an example of a solution suitable for impregnating the textile fabric or the like forming the foundation of the backing, the following may be instanced:—

Nitrocellulose	400 gms.
Alcohol	220 ccs.
Benzene	280 ccs.
Acetone	500 ccs.
Butyl acetate	100 ccs.
Tricresyl phosphate	80 ccs.

The actual construction of the backing of the new card wire or like material may be effected in any convenient way, and the fibrous base of the backing may be of any desired form, for example it may comprise woven or knitted textile fabric, especially cotton fabric, or it may comprise sheet material of the character of felt. The fibrous base, for example cotton fabric, may for instance be impregnated or coated with a solution prepared as aforesaid and utilized directly as the support for the metal teeth. By adjustment of the proportions of film-forming constituents of the solutions and/or the proportion of solution relative to that of the material, the impregnation or coating may be conducted so as to yield a porous material or a non-porous material as may be desired. Alternatively, two or more of such coated or impregnated fabrics, or one or more coated or impregnated fabrics and one or more fabrics which have not been coated or impregnated, may be united to form a multi-ply composite fabric, for example with the aid of heat and pressure or before the coating or impregnating composition has completely dried.

Backing material may very conveniently be constructed by spreading the composition in the form of a paste or liquid on to a textile fabric and thereafter drying, if desired after pressing a second layer of textile material on the composition. By applying further layers of composition and fabric a backing of any desired thickness may be prepared.

The support need not, however, comprise a textile fabric impregnated with the cellulose derivative or like composition as it may consist of a sheet consisting essentially of the composition in question and suitably reinforced by a relatively small proportion of fibrous material. Thus, for instance, one of the aforesaid compositions comprising a cellulose ester or ether, a plasticizer therefor and a volatile solvent may be mixed with cotton flock or like fibrous material, the resulting composition formed into sheets and the latter dried and utilized as a support for the metal teeth.

The metal teeth may be made and disposed in the support in any desired manner. The teeth may for instance be formed in the well-known manner from short lengths of steel, brass, bronze or other metal wire bent into U-shape, the ends being suitably sharpened if desired. The sharpened ends are then pressed through the support, each wire element thus forming a pair of teeth. Any other desired form of construction may, however, be utilized. Preferably, the teeth are fixed in the already impregnated or otherwise prepared support. If desired, however, they may be fixed in a suitable fibrous backing and the latter then impregnated with the cellulose ester or like composition.

If desired, the back of the card wire may subsequently be coated with more of the cellulose derivative or like composition in order to retain the teeth effectively in position, and finally, if desired, a layer of fabric, paper or the like may be applied to the said coating, preferably while the latter is still in a sticky condition.

One type of card clothing according to the invention is illustrated in the accompanying drawing, but it is to be understood that the following description is given by way of example only and is in no respect limitative.

In the figure there is shown a portion of card clothing with one corner of the foundation fabric opened to illustrate more clearly the construction of the material. The foundation of the clothing comprises four fabrics 10, 11, 12 and 13 superposed upon each other in the manner shown, and coatings 14, 15 and 16 of the adhesive material according to the invention between the several layers of fabric. Card wire 17, formed in the well-known manner from short lengths of wire bent into U-shape with ends suitably sharpened, is pressed through the several layers of the foundation fabric from the lower to the upper surface, from which latter they protrude. These ends are bent over at an angle in the manner shown.

What I claim and desire to secure by Letters Patent is:—

1. Card clothing comprising metallic bristles mounted in a non-rigid support containing filamentary material and a substance selected from the group of esters, ethers and ether-esters of polyhydroxy compounds whereby the product is resistant to the destructive action of steam.
2. Card clothing comprising metallic bristles mounted in a non-rigid support comprising tex-

tile fabric associated with a compound comprising a substance selected from the group of esters, ethers and ether-esters of polyhydroxy compounds whereby the product is resistant to the destructive action of steam.

5 3. Card clothing comprising metallic bristles mounted in a non-rigid support comprising a plurality of layers of fabric united with the aid of a substance selected from the group of esters, 10 ethers and ether-esters of polyhydroxy compounds whereby the product is resistant to the destructive action of steam.

15 4. Card clothing comprising metallic bristles mounted in a non-rigid support comprising a plurality of layers of fabric united with the aid of a substance selected from the group of esters, ethers and ether-esters of polyhydroxy compounds and a plasticizing medium whereby the 20 product is resistant to the destructive action of steam.

25 5. Card clothing comprising metallic bristles mounted in a non-rigid support comprising a plurality of layers of fabric united with the aid of a substance selected from the group of esters, ethers and ether-esters of cellulose whereby the

product is resistant to the destructive action of steam.

6. Card clothing comprising metallic bristles mounted in a non-rigid support comprising a plurality of layers of fabric united with the aid of cellulose nitrate whereby the product is resistant to the destructive action of steam. 5

7. Card clothing comprising metallic bristles mounted in a non-rigid support comprising a plurality of layers of fabric united with the aid of cellulose acetate whereby the product is resistant to the destructive action of steam. 10

8. Card clothing comprising metallic bristles mounted in a non-rigid support comprising a plurality of layers of fabric united with the aid of a substance selected from the group of esters, ethers and ether-esters of polyvinyl compounds whereby the product is resistant to the destructive action of steam. 15

9. Card clothing comprising metallic bristles mounted in a non-rigid support comprising a plurality of layers of fabric united with the aid of nitrocellulose and an aryl phosphate whereby the product is resistant to the destructive action of steam. 20

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