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G. DE MESTRAL

3,137,054

APPARATUS FOR TREATING TERRY OR UNCUT PILE FABRIC

Filed July 5, 1961

FIG. 1

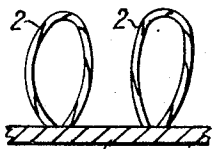
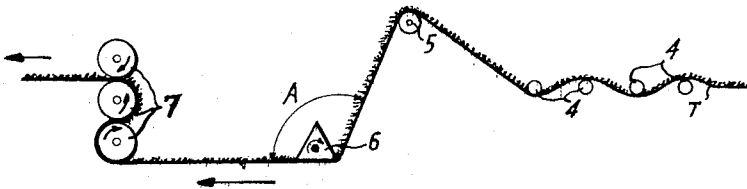


FIG. 2

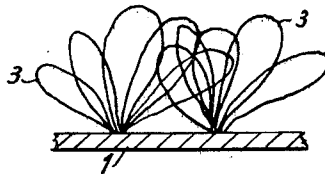


FIG. 3

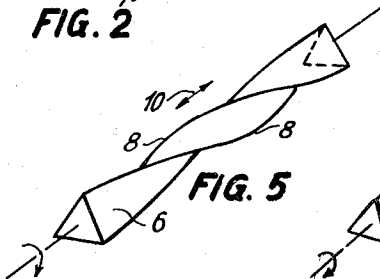


FIG. 5

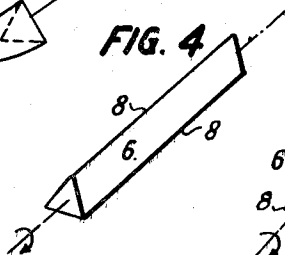


FIG. 4

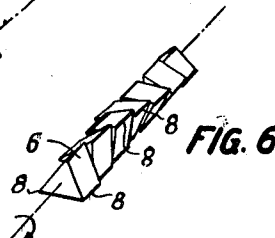


FIG. 6

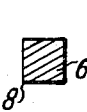


FIG. 7

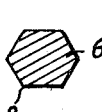


FIG. 8



FIG. 9



FIG. 10



FIG. 11

FIG. 12

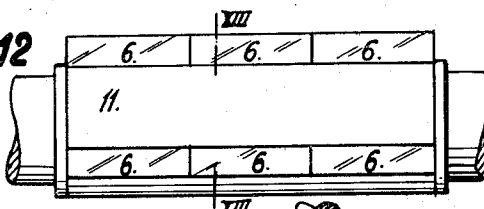


FIG. 13

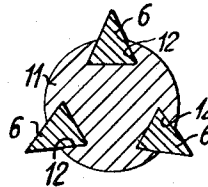
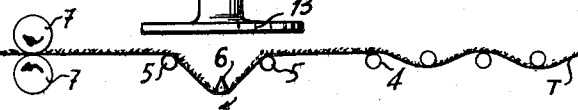


FIG. 14



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APPARATUS FOR TREATING TERRY OR UNCUT PILE FABRIC

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1 Claim. (Cl. 26—28)

For certain special applications, fabrics of the uncut pile or terry type are, as well-known in the art, subjected to a brushing operation which opens the loops by separating the strands forming the latter from one another. Such a brushing operation is generally executed by means of a multiplicity of rotary brushes, the contact with which shifts the threads forming the fabric pile. However, it has been found that this brushing by means of rotary brushes involves the drawback of drawing out to an exaggerated extent a number of said strands, whereby the loops formed are very irregular from the standpoint of size. This uneven character of the loops is objectionable for certain applications.

This invention has for its object a method for treating such a terry or uncut pile fabric which removes the above-mentioned drawback. According to said method, the fabric is caused to frictionally engage a body, the surface of which is somewhat rough. The treatment by means of a rough-surfaced body allows obtaining a much softer brushing than that obtained with a brush, while providing a more uniform expansion of the loops.

The invention has also for its object a machine for executing the above-mentioned method including means for driving and carrying the fabric to be treated. According to the invention, the machine includes, in addition to said means, at least one body provided with a somewhat rough surface and over which the fabric is caused to rub, so as to produce the expansion of the strands forming its loops. The invention has lastly for its object the terry or uncut pile fabric obtained by the above-mentioned method.

The accompanying drawing illustrates diagrammatically and by way of example the principle of the improved method and several embodiments of a portion of a machine according to the invention; in said drawing:

FIG. 1 is a diagrammatic view illustrating a machine for the execution of the method according to the invention.

FIG. 2 is a view on a larger scale illustrating a section of the terry fabric before its treatment.

FIG. 3 shows the same fabric section after treatment.

FIG. 4 is a perspective view of the body provided with a rough surface and forming part of the machine, according to a first embodiment.

FIGS. 5 and 6 show two further embodiments of said rough-surfaced body.

FIGS. 7 to 11 show further cross-sections which may be given to the rough-surfaced body.

FIG. 12 is an elevational view of a still further embodiment of the rough-surfaced body.

FIG. 13 is a cross-section through line XIII—XIII of FIG. 12.

FIG. 14 is a view similar to FIG. 1 showing diagrammatically a further embodiment of a machine for the execution of the improved method according to the invention.

The method described with reference to the accompanying drawing is intended for the treatment of a fabric of the terry or uncut pile type, that is of a fabric such as that illustrated on a larger scale in FIG. 2, said fabric including a backing 1, carrying a number of loops 2 con-

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stituted by multi-strand threads, said treatment having for its object to expand the loops by separating the strands 3 of the latter with reference to one another (see FIG. 3). The method consists chiefly in rubbing the fabric 1, 2 over a body whose surface is of a rough character, such as the surface of an abrading stone of the type used for sharpening knives.

FIG. 1 is a diagrammatic showing of a machine adopted to carry out the improved method. The machine includes means for carrying and feeding the fabric to be treated. The means may include, for instance, glass bars 4 between which the strip of fabric T is caused to pass so that its movement may be braked. The strip of fabric T is caused to pass beyond said glass bars 4 over a transmission roller 5 and is then urged under the body 6 having a rough surface. The strip of fabric T then passes between the driving rollers 7.

The position of the transmission roller 5 is preferably adjustable, so as to allow modifying and adjusting as desired the angle A formed between the two sections of the fabric strip T, which sections extend respectively between the transmission roller 5 and the body 6 and between said body 6 and the driving rollers 7.

In the example illustrated, the body 6 is fitted on a rotary support which is not illustrated, so as to allow a rotary drive of the body 6 simultaneously with the passage of the fabric under it. Preferably, the direction of rotation of the body 6 is selected in a manner such that the direction of its peripheral speed may be the same as that of the shifting of the fabric T in the contacting area between said fabric and body.

The body 6 is advantageously elongated and is given possibly a prismatic shape, as illustrated in FIG. 4, so that its ridges 8 may form projections adapted to produce a drawing out of the pile of the terry fabric T. In the example illustrated in FIG. 4, the rough-surfaced body 6 has a prismatic shape of a triangular cross-section. However, any cross-section may be given to the body 6, provided it has at least one projection along its periphery, which projection is adapted to produce a drawing out of the pile as the fabric T passes over the body 6.

FIGS. 7 to 11 illustrate different examples of the cross-sections which may be given to the bar forming the body 6. In FIG. 7, the cross-section is square. In FIG. 8, it is hexagonal; in FIG. 9, its shape is that of a lens; in FIG. 10, it is that of a star; in FIG. 11, it has a circular shape associated with projections or bosses 9 distributed throughout the periphery of the body 6 and throughout its length.

Tests executed with such bodies have shown that the best results are obtained by giving the body 6 a peripheral speed in a constant direction, which is higher than the speed of progression of the fabric strip T at its point of contact with the body 6.

In the embodiments illustrated in FIGS. 5 and 6, the ridges 8 of the body 6 are helically deformed throughout the length of the latter. In FIG. 5, the helical projection formed by the body 6 is continuous, whereas in the embodiment illustrated in FIG. 6, the body 6 may be considered as constituted by a stacking of identical prismatic elements which are angularly shifted with reference to each other, in a manner such that their successive ridges are finally arranged along points of a helix. In the case of a body 6 of the type illustrated in FIGS. 5 and 6, it may be of advantage to give said body, in addition to the rotary movement imparted to it, a reciprocating movement in a direction transverse with reference to the progression of the fabric T, that is in the direction of the arrow 10 of FIG. 5. To this end, it is sufficient for the support of the body 6 to be capable of sliding along its rotary axis, while a mechanism including a connecting

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rod, an eccentric or a cam, controls a reciprocating movement of the support of the body 6.

In all the embodiments described hereinabove, it has always been assumed that the body 6 was driven into rotation around its own axis. However, the method may be executed even without any rotary drive being imparted to the body 6 and it is sufficient to resort to the mere friction arising between the strip of the fabric T and the body 6 which remains stationary. It is also possible to substitute for the rotary motion of the bar a transverse reciprocation of the kind referred to with reference to FIG. 5. As a further modification, the bar formed by body 6, instead of being arranged perpendicularly to the direction of progression of the strip of fabric T, may be arranged obliquely within reference to said strip. In this latter case, it is preferable to resort to a plurality of bars or bodies 6 arranged for instance in herringbone formation.

As already disclosed, the material forming the body 6 is preferably constituted by a natural or artificial abrading stone, particularly such as that used for the sharpening of knives. However, any other rough material may be used, particularly a body formed by an agglomeration of different components such as particles of a very hard material, embedded in a support formed of a soft material, for example, plastic material, rubber or the like. It is possible, in fact, to form the body 6 of metal after the manner of a smooth file by machining roughly a prismatic bar of metal in a manner such that its ridges may be provided with uneven or rough parts. It is also possible to form each body 6 of glass or of ground crystal.

The method and machine for the execution of the invention are by no means limited to the sole use of a single body 6 and a number of them may be provided in series. It is, in fact, also possible to fit a plurality of them over the periphery of a rotary cylinder, so as to repeat the effect obtained.

The body 6 having a triangular cross-section as illustrated in FIG. 4 or a cross-section of one of the types illustrated in FIGS. 7 to 11, may obviously include a plurality of parts carried in juxtaposition over the same support, for instance a spindle, or else, these parts may be interconnected through their ends, so as to allow the brushing of a fabric having a breadth of, say 140 cm.

In the case of a body of the shape illustrated in FIG. 4, it is possible to provide on the periphery of a cylinder 11 (FIGS. 12 and 13), three longitudinal grooves 12 of a cross-section corresponding to the base of the triangular cross-section of the body 6, which is secured thereto. It is then possible to make a sufficient number of bars 6 slide inside each groove 12, so as to obtain through their juxtaposition the desired total length of operation.

In order to still further improve the spreading and commingling action on the loops 3 of the terry fabric, it is

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possible to subject the strip of fabric T to an auxiliary treatment by setting, for instance, by an infra-red ray heating apparatus 13 in front of the area of the strip T while the latter is subjected to the friction of the body or bodies 6 (FIG. 14). The heat treatment for the fabric strip T may begin ahead of the area engaging the body or bodies 6 and continue beyond the latter in the direction of progression of the strip T.

The heating of the strip T may be such that it reaches the softening temperature of the fibres forming the loops 3 made, for instance, of a synthetic material such as nylon, or the like material.

The improved spreading or commingling of the loops 3 relative to one another, as obtained by said heat treatment, considerably increases the probability of interengagement of the terry fabric with a support provided with hooks, such as that disclosed, for instance, in U.S. Patent No. 2,717,437, in the case where the said terry fabric is intended to form a portion of a connecting system of the type described in said patent.

Experience has shown that, after a thermic treatment of the fabric strip T, the weft of the latter is no longer apparent to view on the side corresponding to the loops 3, by reason of the spreading of said loops.

I claim:

In a machine for treating a pile fabric including multi-strand loops on one face thereof, means for feeding said fabric at a constant speed along a predetermined path, an elongated, abrasive, prismatic body provided with at least one edge for engagement with the loops of said fabric, and means for rotating said body in the direction of and at a greater speed than that of the fabric, said feeding means directing the fabric downwardly from a position above said body to said edge and horizontally away therefrom whereby the individual strands of each fabric loop are drawn and spread out to form a multitude of loops from each of said multi-strand loops.

References Cited in the file of this patent

UNITED STATES PATENTS

1,344,777	Stroud	June 29, 1920
1,555,865	McConnell	Oct. 6, 1925
1,672,712	Dulligan	June 5, 1928
1,917,555	Shuttleworth	July 11, 1933
2,629,918	Swing	Mar. 3, 1953
2,820,277	Forster	Jan. 21, 1958
2,985,942	Nowicki	May 30, 1961
3,001,264	Bloch	Sept. 26, 1961

FOREIGN PATENTS

563,260	Belgium	Jan. 15, 1958
884,556	Germany	July 27, 1953
1,373	Great Britain	of 1912