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METHOD OF APPLYING FLOCK TO A FABRIC

Filed March 9, 1959

Fig. 1.

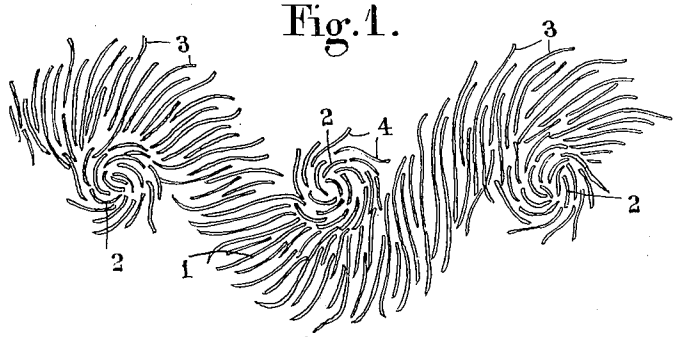


Fig. 2.

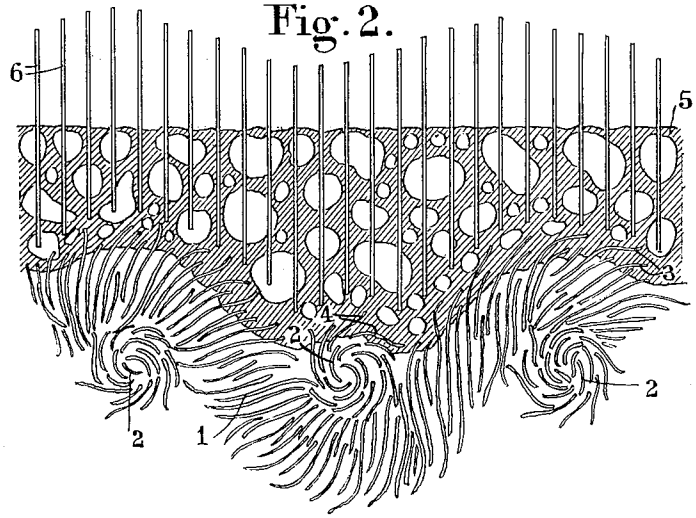
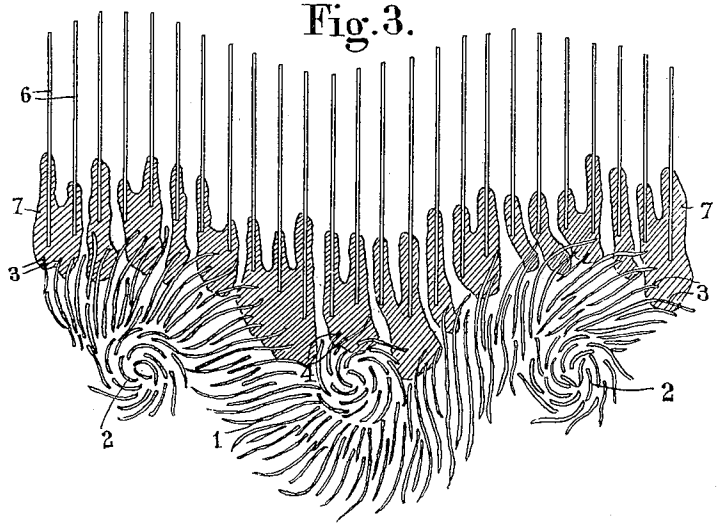


Fig. 3.



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METHOD OF APPLYING FLOCK TO A FABRIC

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4 Claims. (Cl. 117—33)

The principle of flocking fibre on various supports is well known. It consists in allowing short or very short textile fibres to fall at random on a support coated beforehand with an adhesive substance; the short or very short fibres adhere on this substance and produce a novel final article usually referred to as a flocked article.

If very short fibres or even fibre powder are used, buckskin or suede effects are obtained.

If short fibres of the order of one or two millimeters are used it is possible during their fall to render them parallel to one another and perpendicular to the surface of the support, so that when these fibres are retained in the adhesive layer they provide a velvet-like structure with the fibres extending at right angles to the surface of the support.

One known method of causing the fibres to extend at right angles to the surface of the underlying support consists in causing the fibres to fall across an electrostatic field.

In this case, each fibre of a length ranging approximately from 1 to 2 millimeters engages the adhesive layer with one end.

The contact area between each fibre and the adhesive is therefore extremely small, since it consists essentially of the cross-sectional area of the fibre plus a small portion of the fibre surface corresponding to the depth by which the fibre has penetrated into the adhesive substance.

Obviously, this depth is subordinate to the thickness of the adhesive substance.

In other words, the general strength of a textile article obtained by the flocking method depends essentially on the specific strength with which each fibre is retained by and in the adhesive substance; this specific strength itself depends on the quality of the adhesive substance and on its quantity, the latter being subordinate to cost considerations and by certain physical effects produced thereby, notably the weight, stiffness and waterproofing.

If it is desired to produce a double-faced textile article wherein one face is a woven material, or a felt or felty material, and the other face is obtained by the aforesaid flocking method, the structure of the flocked support which constitutes one of the faces of this article, in this case the woven material, must comply for different reasons such as fashion or use contemplated, decorative effects, with certain technical requirements.

Thus, manufacturers were led to adopt relatively loose or wrinkled textures characterized by the presence of many pores, cells or cavities which should normally be filled up by the adhesive substance so that a sufficient quantity of adhesive be present at all points of the surface for properly receiving each fibre upon completion of its fall.

Now the method according to this invention will permit not only the use of such textures for preparing the support material, but also the flocking of fibres longer than those obtainable with any other hitherto known methods, that is, fibres having a length of 4 millimeters or more, by using a relatively small quantity of adhesive substance per unit area and without requiring the filling in of pores, cells or cavities which would render the resulting textile article impervious to air and therefore unpleasant to wear, not to mention its increased weight and stiffness.

The method of this invention consists in utilizing as an adhesive substance latex foam of natural or synthetic rubber, forming a coating of this substance on the selected support, effecting the flocking operation onto this foam layer and causing the latter to collapse by bursting before vulcanizing same.

Natural or synthetic rubber latex foams may be obtained in various manners, a preferred method consisting in the well-known beating process, or in blowing or introducing air bubbles into the latex, the foam thus obtained being then spread on the surface of the support material.

It is well known to specialists that natural or synthetic latex foams have a temporary state rather difficult to maintain. Many methods and means have already been proposed for stabilizing this latex foam during the time period necessary for enabling a slow heating to vulcanize and definitely set the product.

However, for carrying out the method of this invention these stabilizing methods and means are not necessarily resorted to and on the contrary, in most cases, the rubber latex foam structure is left unaltered so that within a predetermined time period of the order of a few seconds the initial foam collapses or, in other words, the air bubbles burst one by one and the foam condition disappears, this foam collapse being facilitated if desired by introducing wetting agents into the foam mixture. The foam stability must be altered as a function of the very nature of the supporting material, as well as of its texture, the kind of fibre constituting same, and the treatments, such as for non-crumpling or waterproofing, which it has occasionally undergone, in order to prevent either the formation of a surface crust caused by an excessive skin jellification which will adequately retain the flocked fibres but will provide a poor binding between this crust and the support material, or on the contrary an undesired excessive penetration of the foam into the support material, as this would be detrimental to the fixation of the flocked fibres.

The collapse of the foam may be controlled accurately by incorporating variable but small quantities either of stabilizing agents, while remaining below normal proportions, or wetting agents.

The penetration of the adhesive substance in the support material must be so adjusted that this adhesive substance forms an integral and intimate part of the support while forming a surface layer sufficient to properly retain the falling fibres.

All this chemical constitution of the foam is so devised that the latter be maintained in its foam condition during a time sufficient to permit:

(1) The proper coating of the support surface with the foam material;

(2) The flocking operation.

Immediately afterwards, the foam must collapse due to the bursting of its air bubbles, before the vulcanization, that is, before introducing the whole product in ovens specially adapted for the vulcanization.

This method provides the following results:

(*a*) The end product consists of a textile support material and of flocked fibres having a relatively substantial length, up to four millimeters or more, this article having the aspect of velvet.

The adhesive substance is so to say invisible as its thickness is practically zero, this substance being suitably distributed at the junction of the flocked fibres with the fibres constituting the woven support.

(*b*) The strength of the flocked fibre, i.e. the holding of each flocked fibre in its support, results from the fact that initially the adhesive substance in foam form is well

spread so as to fill in all the pores, cells and cavities of the support while covering the latter with a layer of appreciable thickness and that the fibres during their fall encounter this adhesive substance in foam form and penetrates therein, so that the contacting surfaces are increased to the maximum possible value.

(*c*) When the air bubbles burst and cause the foam to collapse, the adhesive retracts somewhat along the flocked fibres by capillarity, towards the adhesive coating of the fibres of the support material, so that the adhesive substance is distributed in the best possible conditions and constitutes an efficient bond between all the fibres involved.

(*d*) The articles obtained by this method are suitable for the manufacture of cloths, as a consequence notably of their light weight, their flexibility and their air perviousness; the resistance to dry-degreasing by the use of solvents may be obtained by incorporating thermosetting resins in the latex mixture, this addition having the advantage of increasing the affinity the adhesive substance with the fibres of the support material, and the flocked fibres.

The following description will afford a clearer understanding of the manner in which the present invention may be carried out in the practice, reference being made to the attached drawing, wherein:

FIGURE 1 is a sectional view showing on a material rially enlarged scale the fibres of the woven material utilized as a support;

FIGURE 2 is a similar view showing the same woven material coated with a layer of freshly deposited foam after the projection of the flocked fibres, and

FIGURE 3 is a similar view showing the structure of the assembly after the bursting and vulcanization of the foam.

The woven fabric illustrated in the drawing comprises weft and warp yarns **1**, **2** loosely interwoven so that appreciable gaps are left between the fibres **3**, **4** constituting these yarns.

The adhesive substance is deposited in the form of a relatively thick layer **5** that occupies the interstices between the upper fibres **3**, **4** of yarns **1**, **2** of the fabric and extends at a level above said upper fibres of the fabric.

The flocked fibres **6** penetrate in parallel relationship into this foam layer up to a substantial portion of their height.

After a relatively short time period, this foam collapses due to the bursting of the bubbles formed therein, and the adhesive substance gathers in the form of droplets **7** each clinging by capillarity around one or more flocked fibres as well as around one or more fibres **3**, **4** constituting the yarns **1**, **2** of the support material.

These flocked fibres **6** are thus surrounded up to a relatively substantial height with a film-like layer of adhesive substance whereby they are strongly retained on their support, the resulting textile article remaining nevertheless air-pervious.

What I claim is:

1. A method of manufacturing an article by flocking fibres of a certain length onto one face of a woven-fibres fabric coated beforehand with rubber latex, which comprises the steps of converting said latex into foam, spreading said foam against said face of the fabric so as to form above the upper fibres of said fabric a layer of relatively substantial thickness in relation to the height of the fibres to be flocked, carrying out the flocking step immediately thereafter by projecting the fibres to be flocked perpendicularly against said foam coated face in order to cause the lower parts of said fibres to penetrate into said foam and inbetween the upper fabric fibres, allowing said foam to collapse, to deposit itself in the form of droplets around the flocked fibres and around the upper fabric fibres engaged by said flocked fibres and to retract by capillarity from the flocked fibres towards the upper fabric fibres thus coating only the lower ends of the flocked fibres with the upper fabric fibres.

2. A method of manufacturing a textile article by flocking fibres onto one face of a fabric as set forth in claim 1, wherein the duration of the collapse of said foam is made consistent with the nature of the fabric to be flocked by incorporating in said foam an additional product adapted to regulate the duration of said collapse.

3. A method of manufacturing a textile article by flocking fibres onto one face of a fabric, as set forth in claim 2, wherein said additional product is a wetting agent adapted to reduce the duration of the collapse of said foam.

4. A method of manufacturing a textile article by flocking fibres onto one face of a fabric as set forth in claim 2, wherein said additional product is a stabilizer adapted to increase the duration of the collapse of said foam.

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