

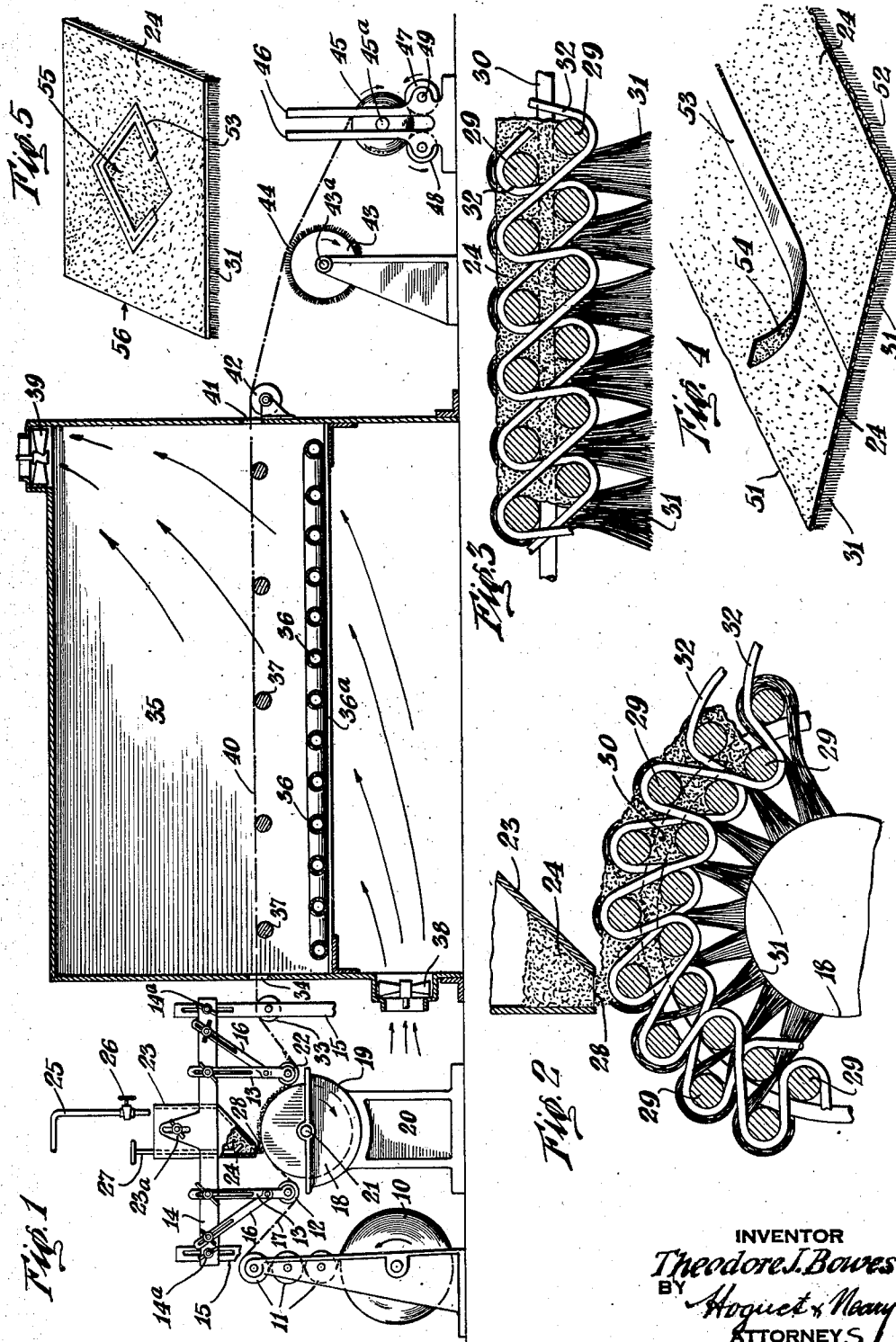
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METHOD FOR TREATING UPHOLSTERY AND FLOOR COVERING MATERIALS

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METHOD FOR TREATING UPHOLSTERY AND  
FLOOR COVERING MATERIALS

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My invention relates to an improved method and means for treating upholstery and floor coverings such as rugs, carpets, linoleums, etc. to render them fray-proof, and more particularly to the mode of application of an adhesive synthetic resin plastic type composition to the base of pile fabric type upholstery or rug or carpet material to hold the pile firmly in the base.

Numerous attempts have been made in the prior art to protect rugs, carpets and other floor coverings against fraying but apparently they are all subject to inherent disadvantages which up until the present time have made them commercially unsatisfactory. One of the representative types of prior art processes comprises applying to the base of rug or carpet material a rubber composition such as the one known to the trade as latex. This type of composition has initially the desired characteristics, that is, it will hold the pile in the base of the rug, but after some ordinary period of use the rubber will stretch or lose its elasticity, in accordance with its inherent characteristics, so that it is no longer suitable for its intended use. Still another and an even more important disadvantage is that this rubber composition will become rancid due to oxidation and give off a disagreeable odor, which of course substantially diminishes the value of the rug or carpet to which it is applied.

In accordance with my invention I treat the base of the upholstery or floor covering material, such as rug or carpet material, with a special type of adhesive, synthetic resin, plastic composition which I have developed. Due to the inherent characteristics of this composition and particularly to the manner in which I apply the composition to the material the limitations and disadvantages of the prior art, such, for example, as those described above, are substantially overcome.

One of the important features of my invention, which is described in detail hereinafter is the particular manipulation of the upholstery or floor covering material during the part of the process in which the base of the material is being impregnated with the adhesive composition. This manipulation consists essentially in flexing or bending the material in such a manner that the interstices between the threads forming the base of the material are greatly enlarged, thus permitting efficient penetration of the base with the adhesive composition.

The adhesive composition is flexible and resilient and will retain these characteristics throughout the normal life of the upholstery or rug or

carpet or the like to which it is applied. Also, it is of such a nature that it does not give rise to any disagreeable odors due to chemical changes that may take place in the composition. By the use of this composition and my improved method of applying it, upholstery, rugs, carpets and other floor covering materials can be made more nearly fray-proof and at substantially less cost than by any of the prior art methods of which I am aware.

The fray-proof characteristic of the floor coverings treated in accordance with my invention adds materially to their usefulness and versatility. For example, a carpet so treated may be cut into strips without the cut edges becoming frayed or ravelled out. This is of particular importance where it is desired to use a single strip of the material, for example, a runner for a corridor.

In another modification of my invention a rug may have sections cut out of its body of different shapes and designs and these cut-out sections replaced by similarly shaped sections of different color or of different material to give the rug an unusual and attractive appearance. This is becoming increasingly prominent in the design of modernistic type rugs for homes and offices. To make the above scheme of rug design a practical one, however, it is necessary in the first place to make the rug material fray-proof to prevent ravelling of the cut edges—this is accomplished by my above mentioned process—and, secondly, to employ some simple means of securely attaching the inserted sections to the main body of the rug. The latter may be done, of course, by stitching the adjacent edges of the rug and the insertions but this proves to be expensive, and, furthermore, mars the appearance of the finished product so that this method defeats the entire purpose of the modification and therefore is not satisfactory. I accomplish this necessary uniting of the several parts of the modified rug in an efficient and simple manner. The details of this part of my invention are described hereinafter but the method consists essentially in wetting the previously coated back of the rug along the edges of the cut-out sections with a suitable solvent for the coating and then joining the inserted portions with the cut edges of the rug by applying thereto a narrow strip of fabric which is coated with a somewhat similar adhesive resinous composition. No heat or pressure need be used. The final product produced by the above method is not subject to the objections characteristic of the prior art which make the finished rug ap-

pear unattractive. In the conformed rugs of my invention there is no apparent connecting line between the body of the rug and the inserted portions so that for ordinary general observation the rug appears to be woven in one single piece. It is of course evident that my above described process for making novel rug designs may be applied equally as well to carpets and other floor covering materials.

It is well recognized that to produce a seamless carpet, that is, one woven to the exact width of the room in which it is to be used rather than in narrow strips, usually thirty-six inches wide, necessitates great expense. The demand for seamless carpets has grown rapidly in recent years, however, so that any method or means which could be developed for making them less expensive would constitute a great advance in the art technically and commercially. In accordance with my invention I am able to join strips of carpet, for example thirty-six inches wide, in such a manner that the finished carpet has a seamless appearance and the method involves comparatively little expense. The method consists essentially in first fray-proofing the strips of carpet by coating the back of the strips with my improved adhesive resinous plastic composition and then joining the strips by moistening the coating along the edges of the carpet and applying thereto an adhesive fabric strip.

An object of my invention is to provide improved methods and means for treating upholstery and floor covering materials to render them fray-proof.

Another object of my invention is to provide a method and means for utilizing an adhesive synthetic resin base plastic composition to join separate pieces of upholstery, or floor covering material in such a manner that the finished product appears to be made from a single piece of material.

While the constituents and proportions may be varied widely, the following Example I will illustrate the type of composition that I use for rendering upholstery, and floor covering materials such as rugs and carpets fray-proof, and Example II illustrates a suitable composition for treating the fabric strips that I use for uniting separate pieces of the upholstery and floor covering material.

#### Example I

|                                                                        | Per cent |
|------------------------------------------------------------------------|----------|
| Synthetic resin (e. g. a resin of the toluene sulfonamide class) ..... | 21       |
| Solvent (e. g. acetone) .....                                          | 69       |
| Plasticizer (e. g. diethyl phthalate) .....                            | 7        |
| Cellulose derivative (e. g. cellulose acetate) .....                   | 3        |

#### Example II

|                                                                        | Per cent |
|------------------------------------------------------------------------|----------|
| Synthetic resin (e. g. a resin of the toluene sulfonamide class) ..... | 24       |
| Solvent (e. g. acetone) .....                                          | 63       |
| Plasticizer (e. g. diethyl phthalate) .....                            | 7        |
| Cellulose derivative (e. g. cellulose acetate) .....                   | 6        |

It will be understood that the solvent will be chosen with due regard to the nature of the resin and cellulose derivative employed. Other synthetic resins suitable for the purposes of my invention are resins of the phenol-formaldehyde and rezyl types. Besides cellulose acetate, other suitable cellulose derivatives that might be mentioned are: ethyl cellulose and cellulose nitrate. Among the plasticizers that may be employed are the esters of phthalic and glycolic acids. It

is sometimes desirable to use more than one plasticizer in the compositions. Also plasticizers of the fireproof type, for example, triphenyl phosphate may be used to render the composition fireproof.

It is important to note that the composition given in Example II has substantially higher percentages of the solid constituents, namely, cellulose derivative and synthetic resin, and a lower percentage of solvent than the composition given in Example I. This increase in solid and decrease in liquid constituents produces a viscous mixture suitable for coating and impregnating the fabric strips, which are used for uniting the separate pieces of floor covering material. A suitable method for preparing such fabrics is disclosed in my copending application Serial No. 719,135, filed April 5, 1934.

The novel features which I believe to be characteristic of my invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation, will be fully understood by reference to the following more specific description taken in connection with the accompanying drawing, in which:

Figure 1 represents diagrammatically a system for continuously treating upholstery and floor covering material such as rug and carpet material to render the same fray-proof.

Figure 2 is an exaggerated sectional view of a small piece of carpet illustrating the flexed condition of the carpet while it is being treated with the adhesive synthetic resin base plastic composition.

Figure 3 is an exaggerated sectional view of a small piece of carpet after it has been treated, showing the impregnation of the base of the carpet with the resinous plastic composition.

Figure 4 is a perspective view of two pieces of carpet which have been made fray-proof by treatment in the system of Figure 1 and are joined together by means of an adhesive fabric strip.

Figure 5 is a plan view of the base of a rug, which has been made fray-proof by my process, and has an inserted portion of different material joined to the body of the rug to produce a novel rug design.

Referring now to Figure 1, one method suitable for fray-proofing, upholstery and floor covering material in accordance with my invention, will be described. While it is to be understood of course that the material which is to be treated may be either pile fabric upholstery, rug, carpet, linoleum, or the like, for the sake of brevity and clearness of description, the material referred to in this specific example will be termed carpet material.

The untreated carpet material is unwound from the supply roll 10 and drawn around the tension rolls 11 and then under the first guide-roll 12. This guide-roll 12 is mounted upon an arm 13 which is slidably connected to the cross member 14 supported by the two standards 15, the latter being shown broken off, for clearness of illustration. Connected to this arm 13 is another arm 16 which is also slidably connected to the cross member 14. These two slidable or adjustable arms permit the roll 12 to be adjusted horizontally and vertically so as to obtain the correct amount of pressure applied by this roll to the strip of carpet material represented here by the broken line 17. The dual purpose of this roll 12 is to guide the material 17, and at the same time press it down upon the large roll 18 75

suspended in the bowl 19 which is in turn supported by the stand 20. This roll 18 is caused to rotate in a clockwise direction by some suitable driving means (not shown) attached to the shaft 21. The carpet material 17 is flexed or formed around a portion of the roll 18 by means of guide-roll 12 and a second guide roll 22. The carpet material 17 is inverted from its normal position so that the pile is in contact with the surface of the roll 18. This means of course that the rolls 12 and 22 are in contact with the fabric base of the material 17.

Above the roll 18 with its flexed strip of carpet is positioned a hopper 23. This hopper contains an adhesive synthetic resin base plastic composition 24 of the type described above. This material is supplied to the hopper 24 as needed from an outside reservoir through the intermediary of the feed line 25 and the gate valve 26. By suitable vertical adjustment of the hopper gate 27 the resinous plastic composition 24 contained in the hopper is permitted to flow by gravity through the bottom opening 28 and thereby deposit on the fabric base of the carpet material 17. The hopper 23 is advantageously vertically adjustable—this is accomplished by means of the slidable connection 23a—so that its distance from the material 17, and consequently the fall or drop of the composition 24 upon the material 17, can be easily controlled. The pertinence of this fall or drop of the composition is explained below. To permit vertical adjustment the hopper 23 may be slidably mounted on the cross member 14, or the member 14 itself may be vertically adjustable, by means of slidable connections 14a, on the standards 15.

The method of deposition of the composition 24 on the base of material 17 and the flexed condition of the material 17 during this part of the process is clearly shown in Figure 2. As is seen from an observation of this figure, in which the sizes of the component parts of the carpet material are greatly enlarged, the carpet is formed around the roll 18 in a semi-circular manner. The longitudinal jute threads in the base of the material are represented here in section by the two sets of circles 29. The transverse jute thread which separates the longitudinal jute threads 29 is represented by the semi-circular member 30. The separate brush-like members 31, which constitute the carpet pile, are anchored to the jute threads 29 and 30 by means of the two interwoven roller-chain threads 32.

As is readily perceived from an inspection of Figure 2, the purpose of flexing or bending the carpet material is to increase the openings between the threads 29, 30 and 32 and between the looped ends of adjacent piles 31 to permit penetration therebetween of the adhesive resinous plastic composition 24. If this composition were deposited upon the base of the carpet 17 without the latter being flexed in some manner the composition would not penetrate into the base but instead would form a coating on the surface of the treads in the base and would thereby fail to cement the pile fibres to the jute and anchor threads. This desired cementing is easily and effectively accomplished however when the carpet is flexed in the manner illustrated in Figures 1 and 2.

It is to be noted also that the amount of penetration into the carpet base by the composition 24 can be controlled somewhat by the height of the hopper 23 with respect to the carpet material 17 and by the consistency of the composi-

tion 24. If the hopper 23 is positioned a substantial distance above the carpet material 17 the composition 24 flowing from the hopper 23 will fall upon the carpet 17 with sufficient force to cause the composition to penetrate into the base of the carpet. As suggested, this effect can be enhanced by properly controlling the consistency of the composition 24.

Referring again to Figure 1, as the treated carpet material leaves the flexing roll 18 it passes under the second guide roll 22 which is mounted upon a slidable arm 13. This roll 22 besides being a guide roll acts also as an impregnating roll for compressing the deposited composition 24 into the base of the carpet. The desired amount of pressure exerted by this roll upon the carpet base and secondly the amount of impregnation of the deposited composition in the base of the carpet can be easily established and maintained by proper adjustment of the two slidable arms 13 and 16 to which the roll 22 is attached. The treated carpet after leaving the impregnating roll 22 passes over a guide-roll 33 and then through the aperture 34 into the treating chamber 35.

In one embodiment of this part of the system of my invention the chamber 35 is approximately 50 feet long and 10 feet high and sufficiently wide of course to accommodate the width of the rug or carpet being treated. The chamber 35 comprises a number of heating coils 36 mounted upon a supporting table-like member 36a which may if desired be made vertically adjustable, a number of idler rolls 37, a suction fan 38, and a blast fan 39. The treated carpet material 40, which now has deposited on an impregnated in its base the resinous plastic composition 24, is drawn through the chamber 35 at the rate of approximately 50 yards per hour. The heating coils 36 liberate heat for drying the composition deposited on and partially impregnated in the carpet 40. The two fans 38 and 39 provide for a continuous flow of fresh air through the chamber 35. The purpose of this air flow is to expel from the chamber 35 the contaminated air and vaporized composition, particularly solvent, which if allowed to remain would keep the coating on the material 40 in a tacky condition. That is, it would not permit it to dry. The contaminated air and gases expelled by the fan 39 may, if desired, be conducted to a suitable condensing apparatus for purposes of salvaging the solvent and other vaporized chemicals.

The treated carpet 40 after being dried passes out of the chamber 35 through the aperture 41 and over the guide-roll 42. The carpet next passes over the drag or spike roll 43, which is caused to rotate in a clockwise direction by some suitable driving means (not shown) attached to the shaft 43a. The roll 43 has arranged around its periphery a number of spikes or teeth 44 that catch the carpet pile and cause the carpet to be pulled through the entire system. From the spike roll 43 the treated carpet passes to the takeup roll 45. This roll 45 is held in position by a shaft 45a which fits into the slot formed by the two upright members 46. The roll 45 is caused to rotate in a clockwise manner by means of the two rotating rolls 47 and 48 upon which the roll 45 rests. Both the rolls 47 and 48 rotate in a counter-clockwise manner. They may be connected together by means of a belt and driven by some suitable common driving means (not shown) connected to the shaft 49. If desired the spike roll 43 and the flexing roll 18, both of which rotate in

a clockwise manner, may be connected by a belt and driven by some suitable common driving means connected to the shaft of either one of the two rolls.

5 In Figure 3 is shown a cross section, greatly enlarged, of a piece of carpet treated in accordance with the above described process. It is important to note that the adhesive resinous plastic composition 24 is not deposited simply as a layer on the  
10 surface of the threads forming the fabric base of this carpet but is actually impregnated in the base up to the point where the pile 31 leaves the base of the carpet. The impregnation of this composition 24 between and around the jute threads 29 and 30 and the anchor threads 32 cause these  
15 threads to be cemented firmly together in a compact manner. In addition to the above described means for effecting this impregnation the unflexing of the carpet itself as it leaves the flexing roll 18 (Figure 1) causes the composition 24 to be  
20 forced in and around the threads of the base. It is to be understood, of course, that the composition 24 is plastic and flexible and therefore does not unduly harden or stiffen the base of the fabric.  
25 As a result of the above described process, it is apparent that the pile 31 is firmly cemented to the base threads of the carpet in such an efficient manner that the usual tendency for this pile to ravel out along the cut edges of the carpet is  
30 greatly reduced if not entirely eliminated.

Referring now to Figure 4, the method of attaching two pieces of previously treated carpet is clearly illustrated. The two pieces of carpet 51 and 52, which have previously been made fray-proof by the method outlined above in the discussion of Figure 1, are placed side by side with their cut but fray-proof edges in contact with each other. The two pieces of carpet are now firmly united to each other by means of the adhesive fabric strip 53. As is shown at one end, this narrow fabric strip is coated on its bottom side with a resinous adhesive composition 54. This composition 54, which may be of the type given above in Example II, is of such a nature that when  
45 moistened with a suitable solvent such as acetone its adhesive properties are made available. For uniting the two pieces of carpet 51 and 52, the strip 53 is moistened, as suggested, and then laid upon the two pieces of carpet with its moistened surface in contact with the base of the carpets along the line where the two are to be joined together. Since the coating 24 on the two pieces of carpet 51 and 52 is of an adhesive nature it is advantageous to moisten it also along the edges of  
50 the carpet which are being united, before applying the adhesive strip 53. The strip 53 is firmly pressed by hand upon the two pieces of carpet and allowed to dry for a few minutes time. Usually five to ten minutes is sufficient. No heat  
60 and only the slight pressure exerted by the hand are necessary for performing this uniting operation. When the drying is completed the two pieces of carpet are united firmly together in a seamless manner and are now ready for use. Numerous strips of carpet joined together in this manner may be very simply and easily placed upon the floor of the room or office which is desired to be carpeted. When carpeting, of course, the base of the carpet with the attached strip 53,  
70 is placed next to the floor. This easy and efficient method of joining separate pieces of carpet in a seamless manner permits of course, cutting the carpet in any desired widths. The edges, of such a carpet, which fit against the walls of the room  
75 are entirely fray-proof due to the fray-proofing

process in which the strips of carpet have been previously treated.

In Figure 5 is illustrated a rug which has been made fray-proof and also conformed to a predetermined pattern or design. This type of rug is made by first impregnating the base of the rug with the adhesive synthetic resin plaster composition 24 according to the above described fray-proofing process. Then a section is cut out of the body of the rug and this section replaced with the similarly shaped but different colored section 55. This section 55 is advantageously previously made fray-proof according to my invention. The section 55 is firmly joined to the body of the rug 56 by means of the adhesive fabric strip 53, described above. For purposes of illustration the simple example shown in Figure 5 has been selected but it will be apparent to those skilled in the art that various and more complicated artistic rug designs may be effected by this method.

For the sake of brevity and clear understanding the detailed description given above illustrates my invention, by way of example, as applied to carpet and other floor covering materials, however, it is to be understood that my invention may be applied equally as well to upholstery materials. For example, furniture coverings, wall coverings, and vehicle seat coverings made from various types of pile fabrics may be rendered fray-proof and conformed to various patterns and designs by use of the above described process and apparatus.

It is further understood that my invention is not limited to the specific materials, apparatus and processes described hereinabove by way of example but is subject to various modifications the scope of which is to be limited only by the prior art and the appended claims.

What I claim is:

1. A method of rendering rug and carpet material fray proof comprising, bending the material in a semicircular form around a rotating roll with the pile portion of the material in contact with said roll to render the base of said material pervious to the fray proofing composition to be applied thereto, dropping an adhesive synthetic resin plastic composition upon said pervious bent base of said material to cause impregnation of said base with said composition but without any substantial amount of said composition entering the pile portion of said material, passing the bent material and deposited composition under an impregnating roll for effecting further impregnation of said base, and finally passing said treated material through an oven provided with a continuous flow of hot air to dry said composition.

2. A method of treating fabrics having a woven fabric base and a pile covering consisting in sufficiently flexing the fabric with the base upward to create relatively large interstices between the threads of said base, depositing a liquid fray-proofing composition directly upon said base and within said interstices without any substantial amount of said composition penetrating into said pile, and drying the applied composition.

3. A method of treating fabrics having a woven fabric base and a pile covering consisting in sufficiently flexing the fabric with the base upward to create relatively large interstices between the threads of said base, depositing an adhesive synthetic resin plastic composition directly upon said base and within said interstices without any substantial amount of said composition pene-

trating into said pile, and drying the applied composition.

5 4. A method of treating napped fabrics having a woven fabric base and a nap covering which comprises flexing said fabric to enlarge the openings between the threads of said base and to simultaneously compress the nap, depositing directly upon the threads of said flexed

base and in the openings therein an adhesive plastic composition, said flexed condition of the fabric insuring thorough impregnation of the base with said composition and inhibiting penetration of the composition into the nap portion of the fabric. 5

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