

Sept. 3, 1929.

P. S. SMITH

1,726,634

TEXTILE FABRIC AND METHOD OF MAKING THE SAME

Filed April 17, 1925

Fig. 1.

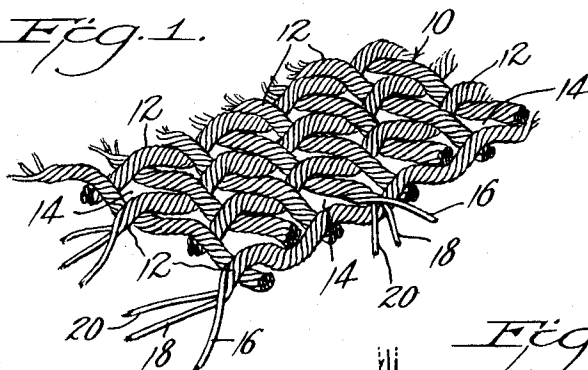


Fig. 2.

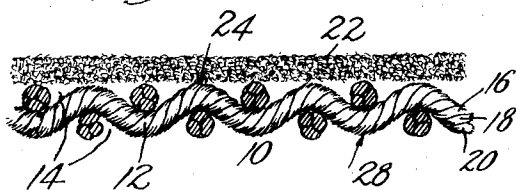


Fig. 3.

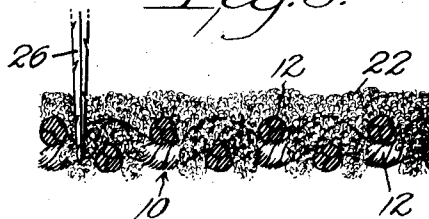


Fig. 4.

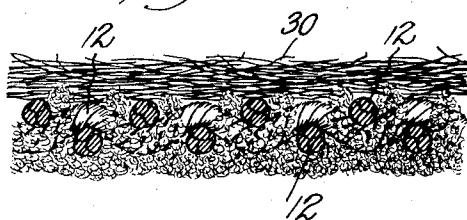


Fig. 5.

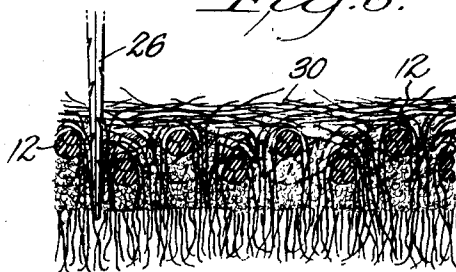


Fig. 6.

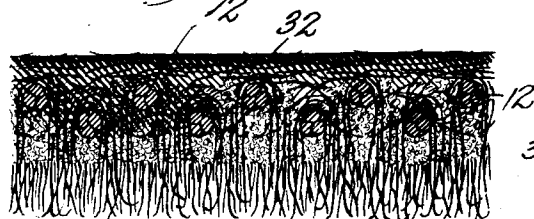


Fig. 7.

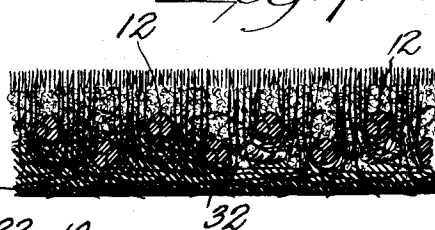


Fig. 8.



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1,726,634

UNITED STATES PATENT OFFICE.

PAUL S. SMITH, OF NEWARK, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
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DELAWARE

TEXTILE FABRIC AND METHOD OF MAKING THE SAME

Application filed April 17, 1925. Serial No. 23,774.

This invention relates to a fabric and to a method of making the same. More particularly, the invention relates to a fabric in which fibrous materials are needled through 5 and anchored to a woven fabric base and a method of needling into the fabric fibrous materials of different types or characters to produce a mixed or a mottled surface effect, and to secure anchorages of the fibrous ma- 10 terials in the base which are markedly firm and resistant to strain and wear. The invention also relates to a needled textile having a fabric base which is particularly resistant to the destructive or tearing actions of 15 the needles in the needling operations.

In needled fabrics into which the fibrous materials are needled, as heretofore made, the base has been formed of lightly twisted or untwisted single strand yarn woven in a 20 loosely woven structure, such as that of burlap. When a bat of fibrous material is placed on a fabric of this type, and needled therethrough, the needles have a tendency to penetrate through the body of the threads 25 of the fabric and thus to tear and disintegrate or separate the threads. This destructive action on the fabric base imposes a limitation on the number of times the fabric may be needled, the number of needling operations being ordinarily limited to two or three, a larger number of needling operations weakening the fabric to too great an extent for practical purposes. The quantity 30 of fibrous material which may be incorporated into the fabric and thoroughly needled therein is correspondingly limited to an extent that prevents any desired results from being obtained, such as may be obtained by 35 from four to six or more needling operations.

In my co-pending application, Serial No. 743,960, filed October 16, 1924, I have described a fabric and a process for making the same in which a base fabric is utilized, such as burlap, through which fibres of an- 40 other material, such as wool, are punched by a needle machine operation, these fibres being anchored to the base by a cementitious material which is applied to the side of the base fabric from which the fibres are needled. A 45 fabric of this type has many advantages in cheapness of construction and in durability, and in particular uses such as for headlining and body cloth and in the present applica-

tion I have incorporated the essential features of the copending case together with 55 certain improvements advantageous in such uses as rugs, carpets and the like.

An object of my present invention is to provide a fabric having fibrous materials needled therein and having a fabric base for 60 supporting and anchoring the fibrous materials which is especially resistant to the destructive action of the needles.

Another important object of the invention is to provide a fabric of sufficient body 65 and having fibres needled therein in such manner as to make the fabric suitable for rugs, carpets and the like, wherein the requirements of stiffness, maximum durability and cheapness of construction are of pro- 70 nounced importance.

Another object of the invention is to provide a fabric having a woven base and a mixture of fibrous materials secured and anchored therein and forming thereon a 75 fibrous surface of a mottled or variegated appearance.

A further object of the invention is to provide a method of needling and anchoring into a fabric base fibres of two or more 80 different types or characteristics, or applied in separate bats, in such a manner as to produce a variety of desired color effects or textures and to secure a tenacious and a strong anchorage of the fibres to the base. 85

Other objects and features of the invention are: to provide a needled fabric having a supporting base formed of threads of tightly twisted strands which are resistant to the penetration of the needles; to provide 90 a fabric having a fabric base into which are needled, from opposite sides, bats of fibrous materials to cause an intermixture of fibres of said bat; and to provide a method of needling fabrics of fibrous materials to 95 a base in which the needling may be done on both sides of the fabric.

With these and other objects in view, the invention comprises the fabric and method of making fabrics, described and set forth 100 in the following specification and claims.

The various features of the invention are illustrated in the accompanying drawings, in which:

Figure 1 is a view showing a base fabric 105 construction used in the present invention,

a thread of the fabric being shown pulled apart from the fabric and separated to show its construction;

Figure 2 is a view similar to that of Figure 1 but showing a bat of fibrous material placed on the fabric base in position to be needled therethrough;

Figure 3 is a view similar to that of Figure 2 showing the bat of fibrous material needled through the fabric base;

Figure 4 is a view showing the needled bat and fabric in inverted position to that of Figure 3 and having a bat of hair placed on the uppermost or inverted surface of the fabric in position to be needled therethrough from the direction opposite to that employed for the previous needling operation;

Figure 5 is a view of the fabric showing the hair needled through the fabric and fibrous layer;

Figure 6 is a view showing the fabric in the same position as that of Figure 5 but having a cementing composition applied to the inverted upper surface to anchor the needled fibres;

Figure 7 is a view of the finished fabric in its normal position with the cemented surface on the lower side and the upper or finished side sheared smooth; and

Figure 8 is a view of a reinforced fabric.

In my present invention, I preferably use as a fabric base a woven fabric, known as press cloth, the threads of which are formed of two or more strands tightly twisted together to form a hard, compact thread of high tensile strength which resists penetration by the needles and tends to cause a relative deflection between the threads and needles and thus causes the needles to pass through the interstices between the threads rather than through the threads themselves. These threads may be formed of any desired textile materials and woven in a manner suited to the finish effects desired, being preferably woven to a somewhat loose, coarse structure, somewhat similar to that of burlap and by the term "press cloth" as employed in the annexed claims is meant a material of this description. On the uppermost surface of the fabric, there is placed a bat of fibrous material, such as jute or wool, which is then needled through the interstices of the fabric by a succession of needling operations, the fibres of the bat being thus incorporated in the base and pushed therethrough and felted to securely anchor it to the base. The fabric and the needled bat and then inverted to bring the bat side undermost and a separate bat of fibrous material, such as hair, is then placed on the upper surface and needled through the fabric and through the bat of wool, jute or other fibrous material, previously needled from the opposite or inverted side, the fibres of the two bats intermingling by the needling

operation. By using bats of fibres of different colors or characteristics, a variegated or mottled surface may be obtained.

In cases where greater body is desired in the finished fabric, a third bat of fibres may be applied to that side of the fabric opposite to that on which the second bat was placed so that on the one side of the fabric there is a layer of jute, for example, and on the other side a first layer of jute and then a layer of hair, for each layer there being portions of the same needled or otherwise pushed through the base fabric to the other side. In the last mentioned construction, the fibres of hair penetrate the adjacent layer of jute, the base fabric and the opposite layer of jute and extend sufficiently beyond the last layer mentioned to constitute a fibrous upper finish for the completed fabric, as shown in Figure 8.

A plastic or cementitious material is then applied to the side from which the second or hair bat has been needled and is then worked into the fabric to the desired degree, penetrating the bat and base. The fabric is then calendered to consolidate the fibres and cured. The opposite or finished side may then be sheared and pressed or otherwise finished.

Referring more particularly to the accompanying drawings, a base fabric is shown as constructed of threads woven in the fabric to form interstices and having a substantially square weave. The threads are formed of a number of tightly twisted strands, three strands being shown by way of example, although threads having from two to upwards of six may be used depending on the fabric desired. The strands of the threads are twisted sufficiently tight to form very dense compact threads which offer sufficient resistance to the passage of the needles to cause a relative displacement between the threads and needles when the needles strike the surfaces of the threads at an angle and to thus cause the needles to pass through the interstices, rather than through the thread bodies.

The threads may be formed of any desired textile material, such as cotton, jute or various other fibres, jute being particularly desirable in the interest of cheapness and strength where a heavy carpet-like fabric is desired. The size of the thread and closeness of weaving may be varied to suit the requirements of a desired fabric but a size of thread and a type of weaving similar to that of ordinary burlap is particularly desirable for the production of a strong, heavy product.

A bat of fibrous material, which may be either wool or jute or any other fibre of which it is desired to form the surface of the material, is placed on the upper surface

24 of the fabric base 10. Fibres are then forced from this bat downwardly through the interstices 14 of the fabric base 10 by means of needles 26 which make several passages through the fabric, two or more needling operations being preferred to secure the desired penetration of the fibres through the fabric base. The fabric base and bat of needled materials is then inverted, bringing the bat 22 and surface 24 to an under position and bringing the former under surface 28 to the top or upper side of the fabric. A bat 30 of fibrous material which may be of different color or texture or characteristic from that of the bat 22 is then placed on the surface 28. For example, a bat of hair such as goat hair, which has desirable qualities of stiffness and durability or alternatively stiff wool or cattle hair, or other fibrous material which it is desired to incorporate in the finished surface, may be employed. Fibres of this bat are then forced by the needles 26 through the interstices 14 and through the bat 22, thereby mingling with the fibres of the bat 22 to produce the desired mottling effect or the other characteristics which it is desired to impart to the finished surface. This needling operation may be repeated as often as desired to secure the required fineness of mixture and thorough anchorage of the fibres, the tightness of twist of the threads of the base fabric permitting from six to eight needling operations without appreciable disintegration or weakening of the base fabric. This manner of needling the material from both sides of the base fabric also enables the fibres to be thoroughly felted on both sides of and through the fabric and to be securely incorporated and anchored to the base.

Where greater body is desired prior to the application of the hair bat, a second layer 50 of jute or other similar fibrous material may be applied to that side of the base fabric opposite to that to which the first bat is applied, and portions thereof needled through the base fabric 10 and the layer of wool or jute 22 on the opposite side. Subsequently, a layer of hair 30 is applied to the second bat and needled through the base fabric and both layers of jute, the fibres thereof penetrating beyond the jute layer on the opposite side of the base fabric and constituting the finish surface of the completed fabric.

An impregnating cement 32 is then applied to the fibrous material 30 on the hair side 28 of the fabric base and forced by processes of impregnation or mangling or other means into the fabric which is then dried, calendered and cured. Any suitable type of cementing or plastic composition may be employed for this purpose, such as a solution or composition of rubber or

rubber latex, or a suspension of rubber composition in water, or other type of cementing composition as may be preferred. This cementing material penetrates the hair or other bat and the base fabric, and serves to secure the felted fibres on the hair side to each other and to further anchor them and secure them to the fabric. The reversed or finished side of the fabric may then be sheared and otherwise finished to obtain a desired finished effect.

When fibres of different colors are employed in different bats, the projecting fibres or hairs on the finished side produce a greyed or mottled effect due to small groups of fibres of one color and texture projecting through a body or bat of fibres of the other color. In this manner, also, fibres of greater wearing qualities may be incorporated with readily felting fibres of poorer wearing qualities to obtain the desirable characteristics of both fibres. Moreover, the backing of the cementing material, in addition to securing the fibres, serves to give the material greater stiffness and to resist sliding when the article is used as rugs or floor coverings.

As changes of construction could be made within the scope of the invention, it is desired that the details of the above description and accompanying drawing be interpreted in an illustrative and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A pile fabric which comprises a base fabric formed of tightly twisted threads adapted to permit repeated needling without causing substantial injury to the said base fabric, and fibrous material needled through the interstices between the threads of the said base fabric, and projecting therefrom to produce a pile surface.

2. A pile fabric which comprises a base fabric formed of tightly twisted threads containing two or more strands tightly twisted together and a bat of fibrous material needled through the interstices between the threads of the said base fabric and projecting therefrom to produce a pile surface, the bat being held in place by a cementing composition.

3. A pile fabric which comprises a base fabric formed of tightly twisted threads composed of two or more strands of jute fibres, and a bat of fibrous material needled through the interstices between the threads of the said base fabric in amounts to form a high density pile fabric, said fibres being held in place by an anchoring cement on the side of the base fabric opposite to that of the pile surface.

4. A pile fabric which comprises a base fabric formed of tightly twisted threads

adapted to permit repeated needling through the fabric without causing substantial injury thereto, a fibrous material needled through said fabric base from one side thereof, a fibrous material of different characteristics needled through the said fabric base from the opposite side thereof and projecting therefrom to form a pile surface, and a cementing composition on the side of the said base fabric from which the last named fibrous material was projected.

5. A pile fabric which comprises a base fabric composed of threads formed of a plurality of tightly twisted strands to permit needling through the interstices between the threads without injuring the base fabric, a bat of fibrous materials needled through the said fabric from one side thereof and projecting from the base fabric to form a pile surface, a bat of different fibres needled through the said fabric from the opposite side thereof, and an anchoring cementitious composition on one side of said base fabric serving to attach the fibres to the said base fabric, said needled through fibres forming upstanding pile on the other side thereof.

6. A fabric comprising a base fabric, a layer of fibrous material on one side of said base fabric and having portions thereof needled through the fabric, a layer of fibrous material on the other side of the base fabric and having portions of the fibrous material needled through the base fabric, and cementitious material anchoring said last named fibrous layer and fibres in said base fabric.

7. A pile fabric comprising a base fabric, a layer of jute fibres applied to one surface thereof and having portions of the jute fibres needled therethrough, a layer of hair applied to the other side of the base fabric and having portions thereof needled through the base fabric and the jute layer on the other side of the base fabric, and means for anchoring the hair in the interstices thereof.

8. A pile fabric comprising a base fabric, a layer of jute fibres applied to one surface thereof and having portions of the jute fibres needled therethrough, a layer of hair applied to the other side of the base fabric and having portions thereof needled through the base fabric and the jute layer on the other side of the base fabric, and means for anchoring the hair in the interstices of the fabric, the fibres of hair needled through the fabric extending beyond the jute layer and forming a fibrous surface above the jute layer.

9. A pile fabric having a base fabric, a layer of fibrous material on one side thereof having a portion needled through the base

fabric, a plurality of layers of fibrous material on the other side of the base fabric, each of said layers having portions needled through the base fabric, and cementitious material applied only to that side of the base fabric on which the plural layers are positioned for anchoring said layers and fibres to the base fabric.

10. A pile fabric comprising a base fabric, a layer of jute fibres on one side of the base fabric having portions pushed through the base fabric to the other side thereof, a layer of hair on the side of the base fabric other than that to which the jute layer is applied, and cementitious material on the hair side of the base fabric, binding the base fabric to the hair layer, portions of jute fibres being pushed through from the opposite side.

11. A pile fabric comprising a layer of press cloth and a plurality of fibres, said fibres being needled transversely through the interstices of the press cloth without causing substantial injury thereto and being anchored therein.

12. A pile fabric comprising a press cloth base, a layer of fibres positioned on one face of the base and having fibres thereof needled through the base without substantial injury thereto and extending on the other side thereof, and anchored to the base by means of adhesive material leaving portions of the attached fibres free.

13. A textile fabric comprising a base fabric, plural layers of fibrous material on one side of the base fabric having fibrous portions thereof pushed through the base, and means for anchoring said fibrous layers and base penetrating fibres in said base, said means including a layer of fibrous material on the side of the base fabric opposite to that of the plural layers, said last named layer having fibres thereof pushed through the base fabric and into said plural layers.

14. A textile fabric comprising a base fabric, plural layers of fibrous material on one side of the base fabric having fibrous portions thereof pushed through the base, and means for anchoring said fibrous layers and base penetrating fibres in said base, said means including a layer of fibrous material on the side of the base fabric opposite to that of the plural layers, said last named layer having fibres thereof pushed through the base fabric and into said plural layers, and cementitious material uniting the plural layers and the fibres extending from the layer on the opposite side of the base fabric to each other and with the base fabric.

In testimony whereof, I affix my signature.

PAUL S. SMITH.

CERTIFICATE OF CORRECTION.**Patent No. 1,726,634.****Granted September 3, 1929, to****PAUL S. SMITH.**

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 58, for the word "and" read "are"; page 3, line 7, for the misspelled word "peneration" read "penetration"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 8th day of October, A. D. 1929.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.