Jan. 23, 1951 F. G. DODGE ET AL 2,538,899

PROCESS FOR THE PRODUCTION OF BATTING MATERIAL

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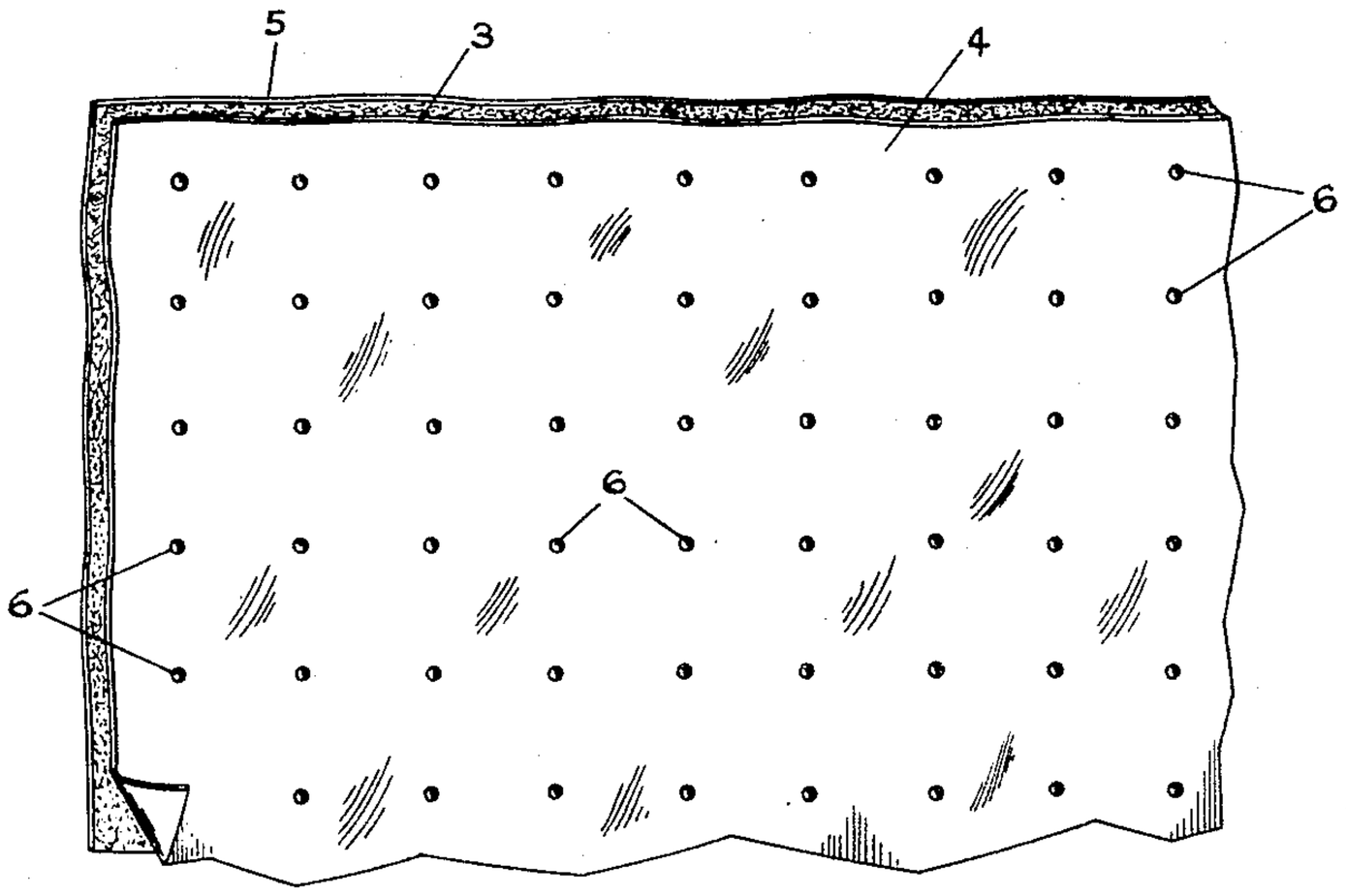

Fig. 1

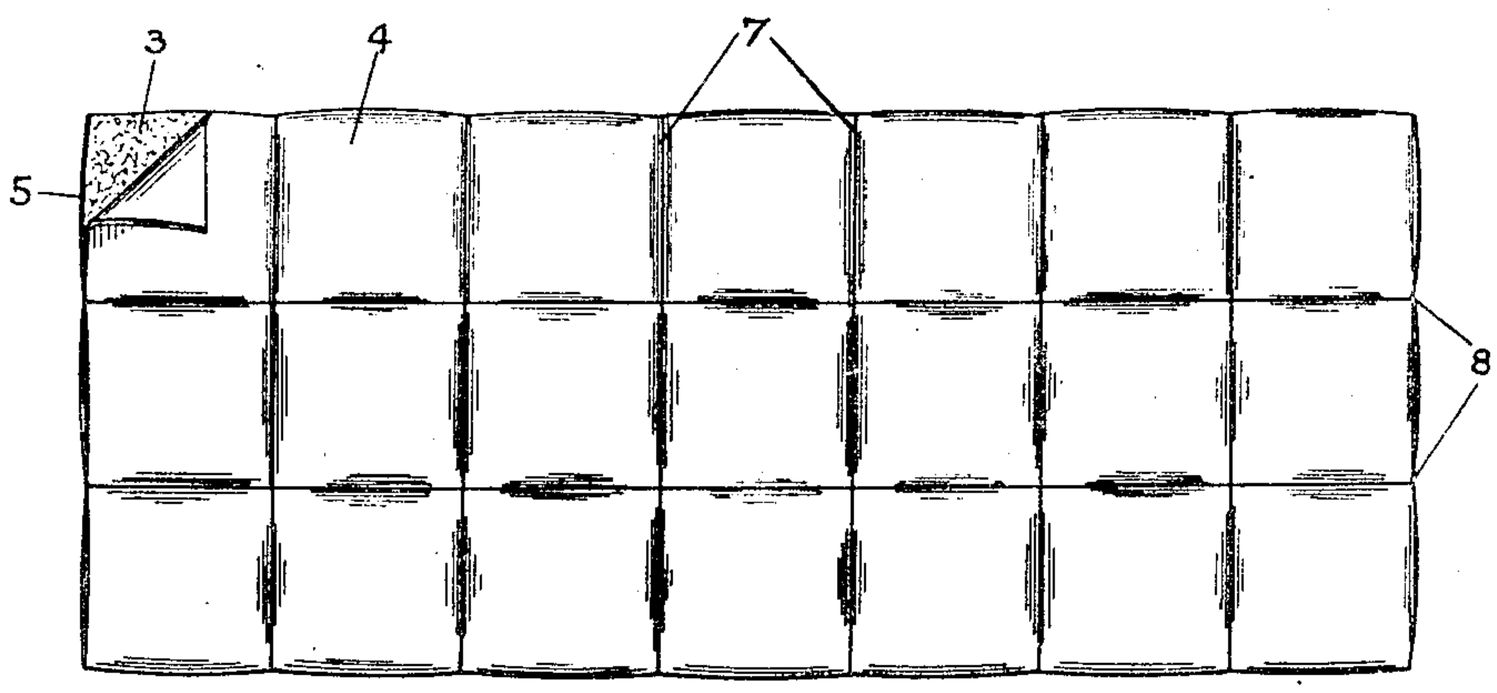

Fig. 2

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PROCESS FOR THE PRODUCTION OF BATTING MATERIAL

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2 Claims. (Cl. 154—33)

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This invention relates to batting materials and relates more particularly to batting materials comprising staple fibers having a basis of thermoplastic materials, such as cellulose acetate or other organic derivative of cellulose.

An object of our invention is to provide improved batting materials comprising filaments or fibers of thermoplastic materials, such as cellulose acetate or other organic derivative of cellulose, which are capable of resisting any changes in structure during service.

Another object of our invention is the production of textile batting materials comprising staple fibers of thermoplastic materials, such as cellulose acetate or other organic derivative of cellulose, formed into a continuous web structure and suitable for use as comforters and the like.

Other objects of our invention will appear from the following detailed description and the accompanying drawing.

In the drawing,

Fig. 1 is a perspective view of a novel batting material prepared in accordance with our invention, and

Fig. 2 is a plan view of another textile batting material prepared in accordance with another embodiment of our invention.

Like numerals indicate like parts throughout the views of the drawing.

Staple fibers having a basis of cellulose or other organic derivative of cellulose have proven to be quite valuable for use in comforters or the like due to their unique properties. Such fibers are vermin-proof and moth-proof. Moreover, they may be prepared in a form possessing any desired degree of crimp. Highly crimped staple fiber materials are capable of forming very substantial dead air spaces even though relatively small quantities are employed and they are, therefore, highly efficient insulating materials. When employed in forming batting materials for use in the manufacture of comforters, sleeping bags, and the like, cellulose acetate staple fiber materials, like other materials employed for such purposes tend to migrate in use, and this migration results in an uneven distribution of the staple fiber materials. Even stitching the staple fibers from which the batts are formed does not anchor the fibers firmly enough to prevent their shifting during used. To overcome this tendency to shift about, the staple fiber materials have been placed in small individual pockets, which are usually sewn within the comforter or sleeping bag. The filling and assembly of these pockets requires a large amount of labor since the pockets must

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be relatively small so as to eliminate an undesirable amount of shifting within the pockets themselves. If the staple fibers are not kept from shifting freely they will, of course, migrate and greatly lower the efficiency of the comforter or sleeping bag as an insulating medium.

We have now discovered that the staple fiber materials employed for filling comforters, sleeping bags and the like, and more particularly staple fiber materials having a basis of cellulose acetate or other organic derivative of cellulose may be anchored within their structure and undue shifting thereof entirely prevented in a practical and efficient manner. In accordance with our invention, these advantageous results may be achieved if the cellulose acetate or other organic derivative of cellulose staple fiber materials in the form of a batt are placed on a web of suitable material, or between webs of a suitable material, such as, for example, a fabric or a relatively thin film, and a suitable liquid having at least a softening or solvent action on the assembly is then locally applied thereto. The fabric may be made of or contain yarns, filaments or fibers of cellulose acetate or other organic derivative of cellulose material, or it may be woven of cotton, regenerated cellulose, silk, wool, linen or other textile material unaffected by the softening or solvent liquid applied thereto. Where a relatively thin film is employed as the web material, it may have a basis of cellulose acetate or other organic derivative of cellulose or it may comprise regenerated cellulose. The liquid may be applied as by piercing the web containing the cellulose acetate staple fibers with a sharp pointed tool hollowed to form a reservoir for the solvent liquid and allowing a few drops of the same to enter at each point which is pierced. The liquid may also be applied to the web covering the cellulose acetate or other organic derivative of cellulose staple fiber in any other convenient manner as by scoring the web on a pattern of crisscrossed, straight or curved lines and allowing the solvent to pass through the scorings and to come into contact with the cellulose acetate fibers to soften them and to cause them to adhere lightly to the web covering as well as to each other. The adhesion of the staple fibers forming the batting material to each other and to the fabric, film or other material in the outer layer effectively prevents the shifting or migration of the fibers and results in the maintenance of the fibers in their original structural relationship, i. e. the original structure of the batt is maintained. Since the fibers cannot move about freely, the original volu-

minous character of the batting material is also retained and the insulating characteristics do not decrease, regardless of the length and character of service.

Any suitable solvent liquids or liquid mixtures having a solvent action on the cellulose acetate or other organic derivative of cellulose staple fibers or web material may be employed. As examples of suitable liquids there may be mentioned acetone, chloroform, ethylene dichloride, acetone and ethyl alcohol, acetone and methyl alcohol, ethylene dichloride and ethyl alcohol, ethylene dichloride and methyl alcohol, and methyl chloride and ethyl or methyl alcohol.

In order further to illustrate our invention, reference is had to the accompanying drawing wherein there is shown an assembly of textile materials formed in accordance with our invention. Fig. 1 illustrates a batting formed of cellulose acetate staple fibers indicated by reference numeral **3**. On the respective sides of the batting **3** are fabrics **4** and **5**, which are preferably made of or contain yarns of cellulose acetate or other organic derivative of cellulose material. The assembly comprising the outer fabrics and the inner batting of fibers are all joined by means of a solvent locally applied at the various points indicated generally by reference numeral **6**. The union is effected by piercing the assembly at each of the several points in the pattern shown, or in any other desirable pattern, and allowing a small amount of a suitable solvent, such as acetone, to enter at each point. The resulting local coalescence of the cellulose acetate fibers causes them to be joined to each other and to the outer fabric, on evaporation of the solvent and firmly to anchor the fibers in a fixed position which results in a fixing of the staple fibers with respect to the covering webs.

In lieu of placing the solvent in the assembly of fabric and batting at spaced points by a piercing operation, the staple fibers forming the batting may be anchored by scoring the assembly by means of a hollowed, pointed tool which acts as a reservoir for the solvent, the scorings being applied in a straight line pattern or curved pattern to yield a quilted effect as shown in Fig. 2. As in Fig. 2, the batting **3** formed of cellulose acetate staple fibers is placed between fabrics **4** and **5** and the solvent is applied by scoring the assembly in a series of substantially parallel rows **7** and **8**. The solvent penetrates the fabric at the scorings, softens the cellulose acetate staple fibers at these points and on evaporation causes them to adhere to each other and to the fabric to form a firm, non-slipping or non-shifting quilted structure as shown. The solvent may be applied by means of any suitable, sharply pointed instrument hollowed to form a reservoir for the solvent and the greater the pressure with a given quantity of solvent the greater will be the cohesion effected.

While our invention has been more particularly described in connection with the treatment of batting materials having a basis of staple fibers of cellulose acetate or other organic derivative of cellulose, the anchored staple fiber batting materials prepared in accordance with the process of our invention may have a basis of other thermoplastic materials which are adapted to be softened by the action of liquid solvents thereon. Such other thermoplastic materials may, for example, have a basis of polymerized vinyl derivatives or of synthetic linear polyamide condensation products, such as nylon. These materials may be softened by any suitable volatile solvent liquid having a softening effect thereon.

Besides the cellulose acetate staple fibers mentioned above, other organic derivatives of cellulose of which said staple fiber materials may be formed are cellulose esters such as cellulose propionate and cellulose butyrate, mixed esters such as cellulose acetate-propionate and cellulose acetate-butyrate and cellulose ethers such as ethyl cellulose and benzyl cellulose.

It is to be understood that the foregoing detailed description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of our invention.

Having described our invention what we desire to secure by Letters Patent is:

1. Process for the production of a batting material of loosely matted staple fibers wherein the migration of the staple fibers is restrained, which comprises forming an assembly by interposing a batting material comprising loosely matted thermoplastic fibers having a basis of an organic derivative of cellulose between layers of fabric, piercing local areas of the assembly with a sharp instrument and simultaneously with the piercing of said assembly furnishing to the pierced areas a volatile liquid which is a solvent for said organic derivative of cellulose staple fibers, whereby the volatile liquid comes into immediate contact with the fabric layers and the staple fibers and effects a softening of the organic derivative of cellulose staple fibers and on the evaporation of the volatile liquid causes said staple fibers to be locally anchored to each other and to the fabric layers.

2. Process for the production of a batting material of loosely matted staple fibers, wherein the migration of the staple fibers is restrained, which comprises forming an assembly by interposing a batting material comprising loosely matted thermoplastic fibers having a basis of cellulose acetate between layers of fabric, piercing local areas of the assembly with a sharp instrument and simultaneously with the piercing of said assembly furnishing to the pierced areas a volatile liquid which is a solvent for said cellulose acetate staple fibers, whereby the volatile liquid comes into immediate contact with the fabric layers and the staple fibers and effects a softening of the cellulose acetate staple fibers and on the evaporation of the voltatile liquid causes said staple fibers to be locally anchored to each other and to the fabric layers.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
80,913	Chipman	Aug. 11, 1868
166,262	Corwin	Aug. 3, 1875
1,642,557	Reynolds	Sept. 13, 1927
1,978,620	Brewster	Oct. 30, 1934
2,039,312	Goldman	May 5, 1936
2,174,534	Shipp	Oct. 3, 1939
2,202,025	Reed	May 28, 1940
2,252,999	Wallach	Aug. 19, 1941
2,306,781	Francis	Dec. 29, 1942
2,385,870	Lashar et al.	Oct. 2, 1945
2,399,258	Taylor	Apr. 30, 1946
2,464,301	Francis	Mar. 15, 1949