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MANUFACTURE OF TEXTILE MATERIALS

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This invention relates to the manufacture of textile materials, and relates more particularly to the production of sheets or webs of fibrous materials.

An important object of this invention is the provision of an improved process for the production of fibrous materials, such as felt, wherein a felting operation is unnecessary.

Another object of this invention is to provide a felt material of improved characteristics.

Other objects of this invention will appear from the following detailed description and claims.

In the manufacture of fibrous materials, such as felt, animal fibers such as wool or hair are subjected to a felting operation, the quality of the felt material depending to a large extent upon the felting properties of the animal fibers employed. The felting action of animal fibers is due to the interlocking epidermal scales on the fibers, and to the intermeshing of the fibers themselves by becoming twined around one another, which condition is enhanced by the curl in the fiber. Heretofore, therefore, it was necessary, in order to obtain felt materials of good quality, to employ only animal fibers having a large number of scales per length of fiber, preferably scales having free edges which protrude to a substantial extent from the surface of the fiber, and/or animal fibers having a high degree of curl.

I have now found that I can produce highly desirable felt materials without placing any dependence upon the felting characteristics of staple fibers employed. In fact, in accordance with my process fibers which normally have no felting properties, such as cotton fibers, regenerated cellulose, etc. may be employed. Animal fibers having substantially few or no scales and being free from curl may also be employed in accordance with my process. I have discovered that by adding thermoplastic derivative of cellulose staple fibers to non-thermoplastic fibers of cotton, wood or other materials and subjecting the mixture of fibers in any suitable form, such as a fleece, to heat and pressure a satisfactory interlocking action of the fibers takes place, the non-thermoplastic fibers and thermoplastic derivative of cellulose fibers becoming interlocked and held together by the adhesive action of the thermoplastic derivative of cellulose fibers, while the derivative of cellulose fibers do not lose their identity.

In accordance with my invention, I form a mixture of cotton fibers and thermoplastic derivative of cellulose staple fibers by any process in which the two fibers are intimately and sub-

stantially uniformly dispersed in each other and then subjecting the mixture of fibers to a carding process wherein heat of a degree sufficient to soften the thermoplastic derivative of cellulose staple fibers, and pressure are employed, to form sheets or webs of felt material. Any suitable percentage of thermoplastic derivative of cellulose fibers as compared with the cotton fibers may be employed in forming the felt materials, the percentage depending upon the characteristics desired in the finished product. Thus, where a softer and looser felt material is desired, a lesser amount of thermoplastic derivative of cellulose fibers is employed than where a stiffer and more compact felt material is desired. The instant invention is particularly applicable to the production of hat bodies and felt padding for use in jackets, coats and the like. In such felt materials from 10 to 60% of thermoplastic derivative of cellulose fibers and 90 to 40% of cotton fibers are found to be suitable. I prefer, however, to employ a mixture of 30% of thermoplastic derivative of cellulose fibers and 70% of cotton fibers to produce the felt materials for such articles.

The thermoplastic derivative of cellulose fibers employed in accordance with my invention are preferably of the same length and diameter as the cotton fibers used. The base material of the thermoplastic derivative of cellulose fibers may be any organic derivative of cellulose such as cellulose esters and cellulose ethers. Examples of cellulose esters are cellulose acetate, cellulose propionate and cellulose butyrate, while examples of cellulose ethers are methyl cellulose, ethyl cellulose and benzyl cellulose. Mixed cellulose esters and ether-esters may also be employed.

Plasticizers or softening agents are incorporated in the thermoplastic derivative of cellulose fibers to lower the temperature at which adhesion occurs. Any suitable plasticizer or softening agent may be employed in accordance with my invention such as, for example, methyl methoxy ethyl phthalate, dimethoxy ethyl phthalate, dimethyl phthalate, diethyl phthalate, mono-acetin, diacetin, tricresyl phosphate, triphenyl phosphate, para toluene sulphonamide and dibutyl tartrate. The amount of plasticizer or softening agent that may be employed depends largely on its plasticizing or softening properties, on the derivative of cellulose used, and upon the degree of softness desired in the final product. I have found that amounts of plasticizers or softening agents from 10 to 100% or more, and preferably 30%, based on the weight of the derivative of cel-

lulose, give excellent results in the production of felt materials suitable for use in hat bodies and paddings for jackets, coats and the like.

Any suitable means may be employed for applying the heat and pressure, such as heated calender rolls, heated continuous platen presses, etc.

In order to increase the interlocking properties of the thermoplastic derivative of cellulose staple fibers, they may be curled or crinkled as, for example, the staple fibers made in accordance with the processes described in Patent No. 1,983,326 to William I. Taylor and Patent No. 2,120,551 to Henry Dreyfus.

By treating with or incorporating in the organic derivative of cellulose staple fibers a solution of an electrolyte in a solvent therefor, the building up of electro-static charges on the organic derivative of cellulose staple fibers is largely or entirely avoided during the carding of the mixture of the organic derivative of cellulose fibers with the cotton fibers.

I have found also that by weighting the organic derivative of cellulose staple fibers they develop a body which will aid in the carding process. The staple fibers may be weighted with a compound of any suitable weighting material such as tin, tungsten, zinc, antimony and the like.

As an illustration and not as a limitation, the following example is given:

Example

A mixture of 70 parts by weight of cotton fibers and 39 parts by weight of cellulose acetate staple fibers which have 9 parts by weight of the cellulose acetate of dimethoxy ethyl phthalate as plasticizer therein are subjected to a carding operation, thus forming a thin web of fleece-like material. Either a single web, or a number of superposed webs, is subjected to a temperature of 300° F. and 1000 pounds per square inch of pressure is applied by a continuous platen press. The

cellulose acetate staple fibers softens sufficiently to cause the cotton fibers to adhere thereto, but do not lose their identity. The resulting material is suitable for use as felt padding which is employed in the production of jackets, coats and the like.

While my invention is particularly applicable to the production of fibrous materials from a mixture of thermoplastic derivative of cellulose materials and cotton fibers, I can also form fibrous materials by replacing the cotton fibers with other vegetable fibers such as linen, jute, etc., artificial fibers of regenerated or reconstituted cellulose, or wool or silk fibers.

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 my invention.

Having described my invention, what I desire to secure by Letters Patent is:

1. As a new article of manufacture, a fleece-like web comprising a mixture of 70 parts by weight of cotton fibers and 39 parts by weight of curled or crinkled thermoplastic derivative of cellulose fibers having 9 parts by weight, based on the weight of the thermoplastic derivative of cellulose, of a plasticizer incorporated therein, in which fleece-like web the fibers are held together adhesively by the thermoplastic derivative of cellulose fibers.

2. As a new article of manufacture, a fleece-like web comprising a mixture of 70 parts by weight of cotton fibers and 39 parts by weight of curled or crinkled cellulose acetate fibers having 9 parts by weight, based on the weight of the cellulose acetate fibers, of dimethoxy ethyl phthalate incorporated therein, in which fleece-like web the fibers are held together adhesively by the cellulose acetate fibers.

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