Patented Feb. 6, 1934

1,945,538

UNITED STATES PATENT OFFICE

1,945,538

ARTIFICIAL FABRIC

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No Drawing. Application May 31, 1930, Serial No. 458,900. Renewed January 19, 1933

8 Claims. (Cl. 92—40)

This invention relates to new and useful improvements in artificial fabrics and more particularly to fabrics formed from cellulosic fibers that have been artificially crinkled by chemical treatment and have been impregnated with rubber latex or similar aqueous dispersions of rubber.

In prior methods of preparing artificial fabrics from cellulosic fibers by impregnation with rubber solutions in various forms, it has been found that fabrics so prepared have had certain undesirable characteristics, such as stiffness, a characteristic of breaking upon flexing or bending the article, a tendency to a poor resistance against abrasion, a tendency for the rubber to oxidize upon ageing, a poor resistance against tearing, and certain other defects.

It is an object of this invention to avoid the aforesaid difficulties in the preparation of artificial fabrics, in other words, to manufacture an artificial fabric from a fibrous cellulosic base by impregnation with rubber so that the fabric will have the characteristics of flexibility, resistance to tearing, resistance to oxidation on ageing, resistance to abrasion, and will furthermore have the quality of not breaking upon bending and flexing the fabric.

The article of this invention may be manufactured by the following preferred form of procedure:

The basic material for the fabric consists of a fibrous cellulosic material prepared in a special manner as more particularly set for in the application of McCormick and Schwartz Ser. No. 283,445, filed June 6, 1928, of which Patent 1,857,100 is a continuation in part. A brief description of this process for treating the fibrous cellulose is as follows:

Wood or other suitable fibrous cellulosic pulp is prepared in any suitable manner and is then treated with caustic alkali, for example, sodium potassium or lithium hydroxide, in aqueous solution at a concentration of from 8% to 35% at room temperature for a short period of time insufficient to cause gelatinization of the cellulose fibers. This time treatment is generally a matter of only several seconds to thirty minutes, the preferred practice being to disperse the pulp with the caustic without cutting action at high pulp consistencies (low ratio of liquor to pulp), such as is disclosed in the examples of the mentioned application and patent, in order to minimize the effect of time action of the strong caustic on the pulp. The caustic solution, when the pulp is completely wet therewith, is diluted with water to stop the reaction. On removal from the alkaline solution the fibers are thoroughly washed with water and are then in the altered condition, exhibiting the appearance of having a crinkle as compared with their original condition. These cellulose fibers are then suitably pulped and felted. For some purposes it is desirable to hydrate the pulp before felting into paper and to this end the crinkled pulp is beaten while dispersed in water in a standard paper beating apparatus for a period of several hours, ranging, for example, from 2 to 12 hours. In this operation it is not desired to cut the fibers but merely to brush them out and hydrate them and to cause the fibers to exhibit a frayed appearance. Thereafter the fibers are deposited in the form of a web, as in known methods of manufacturing paper, and the web is thereupon dried.

The dried web is then passed into a rubber latex liquid in order to impregnate it with the rubber latex. This may be performed in ordinary impregnating apparatus. The desired percentage of the rubber content will range from about 10% to as high as 50% but preferably in the neighborhood of 20% in the finished sheet or fabric. After the impregnation the article is dried in order to coagulate the latex, but other methods of coagulating the latex may be employed, such as passing the impregnated sheet through a 1% solution of aluminum sulphate or other coagulating agent. When coagulated with chemical agents, the sheets are passed through wringers or rollers to squeeze out superfluous liquid and then dried. At the conclusion of the drying operation the sheets are compressed to give a finished appearance and may be calendered or otherwise treated, according to the usual practices in this art.

The resulting sheet has exceedingly valuable characteristics of great utility in the various arts for which such an article of manufacture is adapted. Among its characteristics may be mentioned its great flexibility, its property of showing no paper-break when bent or sharply flexed, its strong resistance to tear and resistance to abrasion, and its non-oxidizing properties. In reference to resistance to tear, it should be more particularly stated that the herein-described sheet will offer strong resistance against tearing by hand, and when subjected to the standard Elmendorf tester it will show a value of between 850 to 1150 in the case of a sheet manufactured to contain about 17% rubber and having a fibre weight of .615 lbs. per 40 inch yard. This particular example is given merely to illustrate the type of fibrous cellulosic-rubber sheet manufac-

tured by this process, and it will be understood that, where sheets of other specific fibre weights are made with other percentages of rubber content, the figures on the Elmendorf tester will, of course, vary with those herein given but will be of the same order of excellence. A sheet of the character just described will have a thickness of about .025 inch, and it will accordingly be seen that such a sheet represents a standard article of manufacture useful for bookbinding, base for linoleum, base for wall coverings, auto top materials, auto interior coverings, furniture coverings, and many other similar and analogous uses wherein fabrics find their employment. It has also been found to be useful for preparing products used in the construction of shoes such as soft toe boxes, inner soles, liners, etc. It is furthermore found that the fabric herein disclosed cuts easily like leather without leaving a frayed edge.

A base material made of artificially crinkled fibers as herein disclosed has unusual strength in view of its extreme porosity. Because of this strength and high absorbency, it is peculiarly adapted to impregnation with latex for the production of vulcanized or unvulcanized sheets having remarkable strength and tear resistance as compared with a product in which this base material is impregnated with solutions of coagulated rubber in organic solvents. In regard to ageing qualities, unvulcanized and coagulated rubber latex ages extremely well. However, the ageing may be affected favorably or adversely by the materials with which the rubber is associated. As previously noted, the product of the present invention has exceptional ageing qualities and it appears, therefore, that the specially prepared base exercises a favorable influence in maintaining the rubber in its non-oxidized state.

It should also be pointed out that this particular fabric is not laminated, but consists of a single deposited sheet impregnated with rubber. It has been found, however, that a laminated sheet may be made by gluing together sheets as herein described or by putting on a multiple deposit during the paper-making step and impregnating the latex into the multiple deposits. Furthermore, instead of laminating, the sheet may be made thicker than herein described so as to constitute a single deposited article equalling in its thickness a multiple-deposited or laminated sheet, and thereby securing advantages in flexibility and structural strength not possessed by laminated sheets. The latter is a particular advantage of this invention.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that I do not limit myself to the specific embodiments thereof except as defined in the appended claims.

I claim:

1. An article of manufacture comprising a web of artificially crinkled fibrous cellulosic material impregnated with rubber latex coagulated therein, said article being flexible, exhibiting no paper-break, and having strong resistance to tear and strong resistance to abrasion, said web being substantially identical with the web obtained by dispersing paper pulp with 8% to 35% sodium hydroxide solution at room temperature, promptly washing out the caustic and felting the pulp.

2. The invention in claim 1 wherein the cellulosic material exists in the condition of hydrated, frayed, beaten fibers.

3. The process of manufacturing an artificial fabric comprising depositing a web of artificially crinkled cellulosic material, impregnating it with rubber latex, coagulating the latex, and drying the sheet.

4. The process of manufacturing an artificial fabric which comprises treating cellulose fibers in pulp form with caustic alkali having a concentration of between 8% and 35%, removing the caustic after a time not longer than 30 minutes, dispersing the crinkled fibers so prepared in water, depositing a web thereof, impregnating the web with rubber latex, and drying the sheet.

5. The process of manufacturing an artificial fabric which comprises treating wood pulp at high pulp consistences with caustic alkali having a concentration of between 8% and 35%, removing the caustic after a time not longer than 30 minutes, dispersing the crinkled fibres so prepared in water, depositing a web thereof, impregnating the web with rubber latex, and drying the sheet.

6. The process of manufacturing an artificial fabric which comprises treating cellulose fibres in pulp form with caustic alkali having a concentration of between 8% and 35% for a time not longer than 30 minutes, washing the treated fibres and dispersing them in water, beating the fibres in the water for from 2 to 12 hours to brush them out and hydrate them without cutting them, depositing a web thereof, impregnating the web with rubber latex, and drying the sheet.

7. The product produced in accordance with the process set forth in claim 5.

8. The product produced in accordance with the process set forth in claim 6.

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