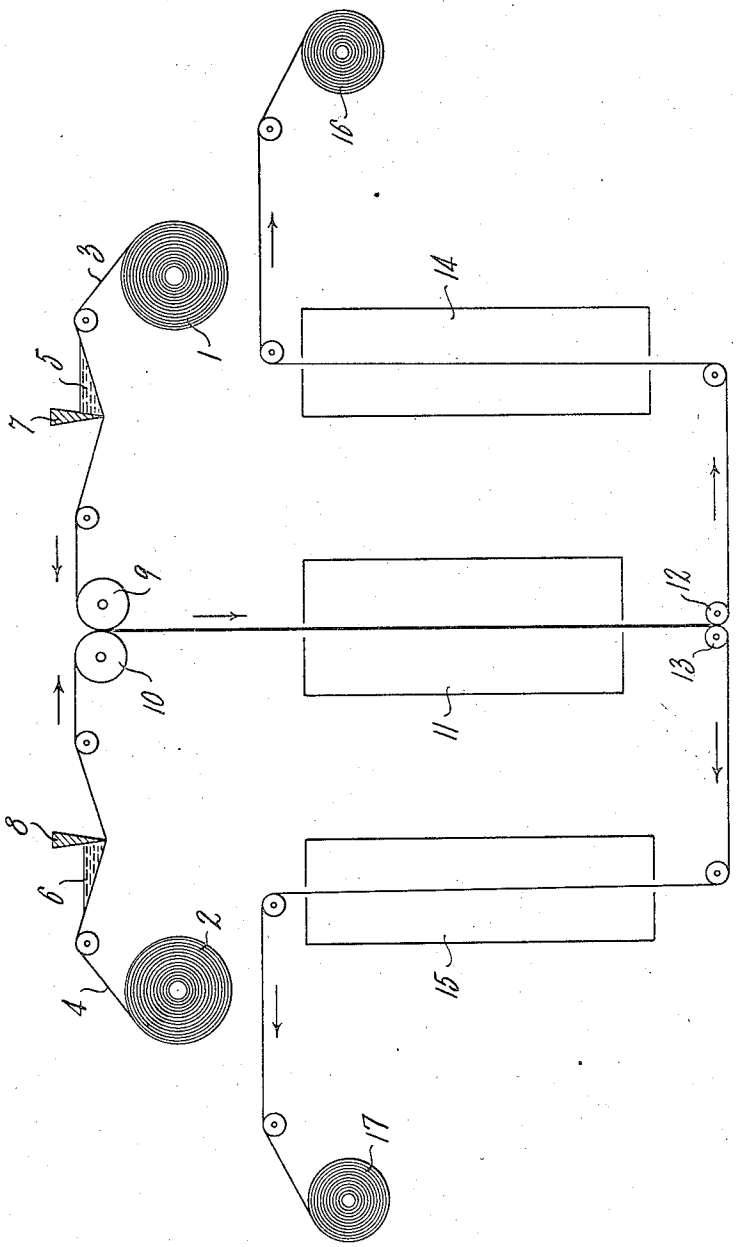
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PROCESS FOR COATING SHEET MATERIAL

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INVENTOR.
DONALD E. FOWLER

BY Ernest J. Bradley

ATTORNEY

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PROCESS FOR COATING SHEET MATERIAL

Donald E. Fowler, Naugatuck, Conn., assignor to United States Rubber Company, New York, N. Y., a corporation of New Jersey

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This invention relates to a process for producing a coating of a film-forming substance on fabric sheet material or the like, and more particularly for producing a rough coating on such sheet material from an aqueous dispersion of the film-forming substance.

In the usual methods of coating sheet material, such as fabrics, rug backings, fibrous bats, paper webs, and the like, with a film-forming substance from an aqueous dispersion of the same, as for example, with the deposit from an aqueous dispersion of rubber, the sheet material is guided under a spreading device, such as a doctor blade or other spreading mechanism where the desired thickness of the dispersion of film-forming substance is spread onto the sheet material and thereafter dried. This produces a relatively smooth surface of film-forming material even on rough material such as rug backings, since the fluid dispersion tends to fill in the indentations on the rough fabric surface and form a smooth film before drying. It is often desirable to have a rough coated surface to increase the surface drag, as in some light fabrics, or to increase the skid-resistance, as in rug backings.

The present invention relates to the production of a rough coating on a vapor-permeable sheet material from an aqueous dispersion of a film-forming substance, such as rubber.

The process of the present invention is illustrated in the accompanying drawing which is a more or less diagrammatic view of a present preferred arrangement of the apparatus for carrying out the coating operation of the present invention.

According to the present invention two sheets of vapor-permeable material, such as fabric, are plied together with a layer of uncoagulated aqueous dispersion of the film-forming substance between the sheets, and the dispersion is partially dried while maintaining the sheets in plied assembly, as by passing the plied sheets through a drying medium. After partial drying of the dispersion, the sheets are then separated, and the drying of the coating on each sheet is completed. The extent to which the drying of the dispersion between the plied sheets is carried out before they are separated, depends on the kind of sheet material to be coated, the nature of the dispersion of film-forming material, and the exact surface effect on the coating desired, but it is a simple matter in any case to determine empirically the extent of partial drying necessary to give the desired rough effect. As the plied vapor-permeable sheet material with the intermediate layer of uncoagulated dispersion is passed through a heating medium to partially dry the dispersion, the aqueous phase of the dispersion proceeds to vaporize and escape through the plied sheets and coagulation of the dispersion starts at the interfaces of the dispersion with the vapor-permeable sheet material and proceeds with further drying of the dispersion toward the center of the dispersion layer. When the sheets are separated, the partially dried film of dispersion breaks leaving a rough surface on the face of each sheet. Some dispersion compounds pass gradually from the uncoagulated to the coagulated state with very little increase in the wet strength of the film, and it is possible to pull the sheets apart after coagulation is substantially complete but before the film has dried sufficiently to develop much strength. In such cases, the partial drying may be continued to coagulation throughout the thickness of the dispersion layer. In other cases the wet coagulated film is very strong and here it is desirable not to let coagulation go too far but to separate the sheets before the dispersion has completely coagulated throughout its thickness. After separation of the individual sheets with the rough partially dried coating adhered to the surface of each sheet, the sheets are individually passed through drying media to complete the drying of the coatings.

In conjunction with the drawing, there will be described the coating of the back of light weight terry cloth rug material with rubber, but it is understood that the present invention is equally applicable to the coating of other vapor-permeable sheet materials with various other film-forming substances from aqueous dispersions of the same. For example, the invention may be utilized for producing a rough coating on various textile fabrics, such as a square woven, knitted or other types of pile fabric, paper and fibrous bats and boards, carded webs, and the like. The film-forming substance may be substantially any type of film-forming substance that is dispersible in an aqueous medium. Rubber may be deposited as a coating according to the present invention from natural latex or from artificial aqueous dispersions of crude or reclaimed rubber. Aqueous dispersions of synthetic rubber and other materials, such as emulsions of polymerized chloroprene, known as neoprene latex, and aqueous emulsions of copolymers of butadiene with other polymerizable materials such as styrene and acrylonitrile, known as Perbunan latices, have been used. Similarly, aqueous dispersions of polyisobutene, polyvinyl chlo-

ride, polyvinyl acetate, and cellulose esters may be used.

Referring more particularly to the drawing, which illustrates the process of the present invention with reference to the coating of a terry cloth rug material with a rubber backing, 1 and 2 represent reels of the rug material to be rubber coated from which lengths of the terry cloth rug fabrics 3 and 4 are unwound. Rug fabrics 3 and 4 are coated on the backs with an aqueous dispersion of rubber from banks 5 and 6 of the dispersion by means of spreader knives 7 and 8 which are adjustable to give the desired thickness of coatings. The rug fabrics 3 and 4 are plied together before the rubber dispersion coatings have coagulated by passing between conventional textile combining or doubling rollers 9 and 10. The plied rug fabric material is then passed through a drying unit 11 where the rubber dispersion between the sheets 3 and 4 of the plied material is partially dried to the desired extent, after which the fabric sheets 3 and 4 are pulled apart at rollers 12 and 13 and then individually passed through driers 14 and 15 to complete the drying of the coating and vulcanization of the rubber, after which the coated rug fabrics are wound up on rolls 16 and 17.

In the above example, an aqueous dispersion of whole tire reclaim dispersed on alkali soap and stabilized with alkali caseinate and compounded according to the following formulation was used:

	Parts by weight (dry)
Reclaimed rubber in dispersion	100
Water in dispersion	100
Ground vulcanized rubber (filler)	100
Whiting (filler)	25
Zinc oxide	1.5
Sulphur	1.5
Zinc salt of mercaptobenzothiazole (accelerator)	1.5

Water to 65% solids of compound.

The zinc oxide, sulphur, and accelerator were added as aqueous pastes in the usual manner by compounding rubber dispersions. The compound was of easy spreading consistency and a layer of the compound about .05 inch in thickness was applied to the back of each of the two rug fabrics 3 and 4 as above described and without substantial drying the two rubber dispersion coated surfaces were brought together by the doubling rollers 9 and 10. The drier 11 was a conventional hot air drier in which air circulated at 120° C. The plied rug fabrics remained in the drier in passage for 7 minutes. After egress from the drier 11 the fabrics were pulled apart at the rollers 12 and 13, whereupon the rubber separated through the middle of the rubber film leaving a rough surface. The coated fabrics were individually further dried and vulcanized by heating for 10 minutes in the driers 14 and 15 in which air also circulated at 120° C. In the example illustrated in the drawing and as described above, the rubber dispersion was applied to both the fabrics 3 and 4, but if desired, it is only necessary to apply the aqueous dispersion of film-forming material to one of the two fabrics and then to ply the uncoated fabric to the thus coated fabric before partial drying of the film-forming material between the two plies after combining.

As various modifications will occur to those skilled in the art, it is not intended to limit the invention other than as set forth in the appended claims.

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

1. A process for producing a rough rubber coating on vapor-permeable fabric which comprises plying together two sheets of vapor-permeable fabric with a layer between said fabric sheets of uncoagulated aqueous dispersion of rubber which is adherent in the dried state to each said fabric sheets, partially drying said dispersion while maintaining the sheets in plied condition, then separating the plied sheets whereby a partially dried coating of the aqueous dispersion of rubber will be adhered to a surface of each sheet, and thereafter individually completing the drying of the coating on each such fabric sheet.

2. A process for producing a rough rubber coating on vapor-permeable fabric which comprises plying together two sheets of vapor-permeable fabric with a layer between said fabric sheets of a substantial thickness of an uncoagulated aqueous dispersion of rubber which is adherent in the dried state to each said fabric sheets, partially drying said dispersion while maintaining the sheets in plied condition, then separating the plied sheets whereby a partially dried coating of the aqueous dispersion of rubber will be adhered to a surface of each sheet, and thereafter individually completing the drying of the coating on each such fabric sheet.

DONALD E. FOWLER.