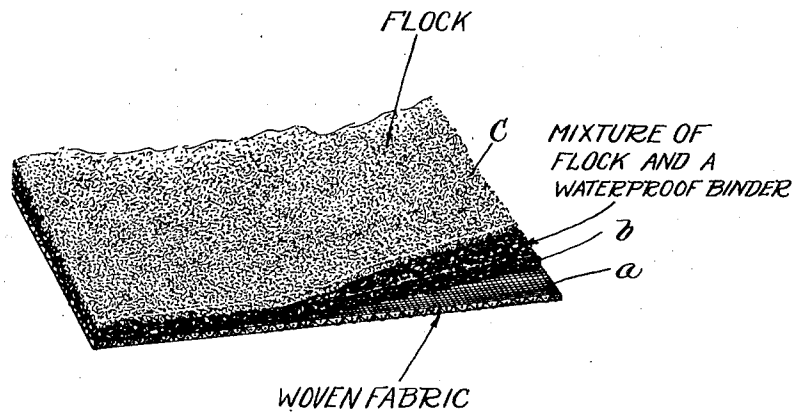


E. H. ENOS.  
WATERPROOF FABRIC AND PROCESS OF MAKING SAME.  
APPLICATION FILED FEB. 3, 1920.

1,408,871.

Patented Mar. 7, 1922.



*Inventor:*  
*Edward H. Enos*  
*by* *Edith Brown Lindsey* *Attys.*

# UNITED STATES PATENT OFFICE.

EDWARD H. ENOS, OF SALEM, MASSACHUSETTS.

WATERPROOF FABRIC AND PROCESS OF MAKING SAME.

1,408,871.

Specification of Letters Patent.

Patented Mar. 7, 1922.

Application filed February 3, 1920. Serial No. 355,962.

*To all whom it may concern:*

Be it known that I, EDWARD H. ENOS, a citizen of the United States, residing at Salem, in the county of Essex and State of Massachusetts, have invented new and useful Improvements in Waterproof Fabrics and Processes of Making Same, of which the following is a specification.

The object of this invention is to provide a sheet material, capable of a variety of uses, such as a substitute for leather, artificial leather, felt or the like, in the manufacture of automobile upholstery, or in the manufacture of shoes, hats, upholstery and for other purposes.

It is naturally desirable that such material should be durable and that it should be water-repellent or waterproof, that it should be flexible and capable of a certain degree of stretching without cracking, and should possess a pleasing appearance. The material, which I shall hereinafter describe, possesses these optimum characteristics and is capable of being produced in various colors, shades or tints.

The drawing shows conventionally a material embodying my invention.

In the production of the said material, I preferably proceed as follows. A suitable fibrous foundation, preferably of some relatively strong textile, such as cotton sheeting, drill or duck, indicated at *a* on the drawing, is dried to sufficiently remove any moisture therein contained, such drying, however, being accomplished at a degree of heat which will not injure the fibers. In lieu of a textile fabric, a felted sheet may, if desired, be employed. Upon this foundation so afforded there is spread an adhesive layer *b* which consists essentially of very short fiber cotton, wool flock, or other short fibers, in thorough admixture with a water-resistant binder, such mixture being sufficiently fluid or plastic so that it is capable of being spread by any suitable instrumentalities upon the surface of the foundation. For example, in preparing this layer, I may use a rubber cement such as produced by dissolving the pure rubber in naphtha (called "spreading cement"), but it is evident that any other binding material may be utilized in lieu thereof. The flock or flock-like material is preferably dried before their introduction into the liquid binder, and the two are so thoroughly mixed that practically each minute

fiber is coated and more or less impregnated with the waterproofing compound. The mixture may be in the proportion of one pound of flock to one gallon of cement. The mixture thus provided is spread, as stated, upon the foundation to form a layer of the desired thickness, the binder permeating the fibers and interstices of the foundation and affording an intimate interlocking of the layer therewith. While the layer is still more or less plastic or sticky, I form thereon an exterior coating *c* of fine flock, which may be accomplished by means of a blowing apparatus or other suitable instrumentality, this being accomplished in such manner that the entire surface of the layer is coated or faced with an adherent exterior layer of the flock. When a binder containing a volatile solvent is employed, the material may be subjected to heat in order to drive off the solvent, or, if the binder is in a fluid or plastic condition because of a treatment with heat, it is permitted to cool and set.

The flock, which is utilized for the exterior covering or coating, may be dyed to any desired shade, tint or color previous to its application to the adhesive layer. In fact, all of the flock or short fibers which are intermixed with the binder and the binder itself may be dyed or colored if desired, so that, in the event of the exterior coating becoming worn off after prolonged use, the flock or other short fibers in the intermediate layer which is exposed will present the same appearance as the remainder of the exterior.

In appearance the finished product looks something like a very fine finished woolen fabric. It may be used, as stated, as a covering for upholstery and in manufacturing various articles heretofore made of leather or imitation leather, as well as for such other purposes as hereinbefore referred to. In some cases, I may omit the exterior facing of the flock and subject the coated foundation to the action of the dies or other instrumentalities to give it an embossed appearance, although for some uses it is even unnecessary to emboss it.

The fabric, with or without the exterior flock facing, is flexible, capable of being stretched to some extent without cracking, is water-repellent, and is capable of many uses in the arts.

I do not desire to limit myself to any

particular form of binder provided it serves the purposes which I have herein described, as it is quite apparent that other forms of water-repellent adhesives may be employed in lieu of that described.

If desired, the initial layer, consisting of the mixture of the short fibers and the binder, may be permitted to dry or set, and then a very thin coating of the binder applied to the surface thereof before the final application of the flock. The latter, as stated, should be in a dry condition so that it will readily adhere to the surface of the coated foundation, and present, as stated, the appearance of fine woolen fabric. The coated and flock-surfaced fabric may, if desired, be passed through calender rolls. Of course, it will be understood that the foundation may be treated on both faces or only on one face as hereinbefore described.

What I claim is:—

1. A flexible sheet material comprising a suitable foundation, a layer thereon consisting of a mixture of flock and a water-

repellent binder, and a facing of flock adherent on the surface of said layer.

2. A sheet material comprising a fibrous foundation, a relatively thick layer thereon consisting of flock and a water-repellent binder, said binder binding the flock or other short fibers together in a mass and permeating said fibrous foundation and locking the mass of flock thereto, and an exterior facing of flock entirely covering said layer and adherent thereto.

3. A process of making a sheet material of the character referred to, which comprises intimately mixing flock and a water-repellent adhesive binder to form a plastic mass, spreading such mass in a layer on a fabric foundation, while said layer is still plastic and adhesive, coating the same with flock, and finally permitting the binder to set, substantially as set forth.

In testimony whereof I have affixed my signature.

EDWARD H. ENOS.