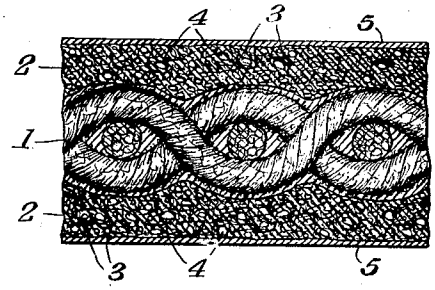
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MATERIAL IN THE NATURE OF LEATHER SUBSTITUTE AND PROCESS OF MANUFACTURE

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MATERIAL IN THE NATURE OF LEATHER SUBSTITUTE AND PROCESS OF MANUFACTURE

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This invention relates to special materials useful as leather substitutes and the like, and to the methods of producing the same.

Objects of the invention are to produce a material having leather-like characteristics of strength, resiliency, porosity, pliability, durability and wearing qualities and to obtain such product by economical practical manufacturing steps.

These and other desirable objects are attained by the novel features of invention hereinafter disclosed and broadly claimed.

The drawing accompanying and forming part of this specification illustrates a typical embodiment of the invention, it being understood that the actual physical structure may vary as regards this disclosure within the true intent and full scope of the invention.

The single figure in the drawing is a broken sectional fragmentary view of a portion of the new product, greatly enlarged to illustrate details which otherwise might not be appreciated.

The central base structure is a woven fabric of cotton or other suitable textile material, preferably of sheeting weave because of the low cost, simplicity and flatness of structure. This central base fabric is designated 1 in the illustration.

The building up stages involve the application of surface layers of adhesively saturated cotton garnet, carding wadding, cotton or cotton and wool felt, or absorbent, fluffy, low gravity alpha cellulose paper, with a solution of a vulcanizable rubber compound and the application of pressure. The saturated wadding, felt or low gravity paper layers are designated 2, and these provide a mass of matted arched fibers 3, forming numerous air voids 4, and giving the desired porosity to the structure.

The base structure may be assembled by inserting a sheet of woven cotton fabric between layers of cotton being laid from the cards or garnet machines, thus providing a central woven base with layers of wadding on both sides of the same.

In another form, a sheet of woven fabric is inserted between the feeds of a felting machine to produce an assembled base of felt having a woven central structure.

In another product, woven cotton fabric is inserted on a cylinder or Fourdrinier after the first alpha cellulose fibers have been formed, causing the paper formation to continue over the fabric and producing an assembled base of a woven fabric between sheets of loose, low gravity, alpha cellulose paper.

In each of the instances described, the surface layer may be applied to one only instead of to both surfaces of the central base fabric.

Each individual fabric section or the assembled base fabric is firmly wound upon cores in rolls, which usually may be around 300 yard lengths. These rolls are mounted in the frame of a machine similar to a doubling machine equipped with two steel pressure rolls driven so that their surface speeds are approximately the same and separated a variable extent. The fabric is passed or pulled through these pressure rolls as it is released under tension produced by brake mechanism acting on the core of the roll and is wetted on one or both sides with adhesive before reaching the bite of the rolls. The pressure rolls thus act to press and express the adhesive into and through the fibrous structure and to push back surface adhesive. The saturated fabric is passed into a drying chamber suitable for removal of the solvent of the adhesive which, if desired, may be recovered for re-use.

The fabric may be under continuous tension during drying, or may be subjected to tension any time after drying and then may be pressed by passing between rollers, while dry or practically dry, to so smooth the surfaces as to bend upstanding fibers back into the sheet body.

For one type of leather substitute, the smoothing pressure last described should be only of a magnitude to bring the fibrous surfaces into an orderly condition, excessive pressure which would over-consolidate the sheet into dense condition or destroy the myriads of air pockets or voids within the outer layers above avoided. If desired, the saturating process may be repeated one or more times to increase the quantity of adhesive.

Another and different type of leather substitute may be produced by using a final pressure of heavy calendering proportions resulting in a consolidated dense sheet of a tough nature, strong and wear resistant to friction, such as required for soling leather.

A preferred saturating adhesive is a rubber compound containing vulcanizing materials and dissolved in naphtha. This may however be dissolved or dispersed in any suitable medium and the rubber compounding may be of the usual properties known in the art, of any color, mineral or organic, firm or soft, tacky or dry, heavily or lightly loaded and may contain loadings of fibers of textile or wood origin, or both. It is also with-

in the intent of this invention that liquid (water) solution of vulcanized, and/or vulcanizable compounded latex be used as an adhesive.

The saturation of the individual fabric sections is readily effected and proper setting of the saturator rolls makes it possible to use high bodied doughy adhesive solutions, which save costs by their low naphtha content. The saturation of the layers separately therefore has certain distinct advantages. Saturation of the assembled base layers is determined to some extent by the weight, density and thickness of the individual layers, requiring greater pressure on increase in any of these properties. The assembled fabric may therefore to advantage be passed through a bath to wet both sides with relatively low bodied adhesive solution. The saturation of the assembled base fabric may be considered complete and within the spirit of the invention when sufficient adhesive has penetrated the woven central fabric to prevent raveling under ordinary wear.

While the pressure rolls constitute a preferred form of pressure applying surfaces, other types of pressure surfaces may be used, as for example, the adhesive wetted fabric may be pulled through a slot provided by pressure plates set at an angle converging to an orifice.

The fabric layers when separately saturated are brought together, if desired, with additional film or films of adhesive between the layers, to increase the bond between the sections. This film or films may be applied as a knife application to the sections before mounting on the doubler machine or a spreader knife may be arranged on the doubler to apply adhesive just before doubling.

When the material is to be used as undressed leather, or is to receive a dressing that does not require vulcanization, the next step is to vulcanize the saturating adhesive, except in the case involving use of already vulcanized latex. When the vulcanizable rubber compounded coating is to be the dressing, the natural method is to reserve vulcanization until after such coating has been applied. The use of vapor cures to effect vulcanization obviates the need of including vulcanizing materials in the compounding of the rubber adhesive and this is included in the spirit of the invention. The product brought up to this stage is useful as undressed leather. It may be dusted with starch, talc, soapstone or other dusting agents to improve the leather-like feel of the material.

When it is to be used as dressed leather, the material is coated in a manner similar to methods used in coating ordinary artificial leather, for example, by successive coatings of rubber, pyroxylin or oil, and which may be compounded and applied according to accepted practice. The surface coating or dressing may be such as to take embossing, printing or other finishing effects.

It is recognized that leather substitutes have been produced heretofore as disclosed in the patent to Roland B. Respess No. 1,441,376 by napping a flannel base to gain a loose fibrous condition. The present invention however, has the advantage of the loose fibrous condition without the weakening of the base structure by napping operations.

The woven fabric center or core contributes maximum strength and tear resisting qualities and the applied layer or layers of rubber reinforced fibers by their arch-like structural interlacing, contribute porous, cushiony, resilient, plastic, soft and anchorage qualities and combined with the adhesive give desired flexibility, pliability and non-raveling characteristics. The pressure employed in cementing the saturated wadding or like material to one or both sides of the saturated woven fabric is regulated and controlled to suit the materials employed and the desired characteristics of the finished product, being usually such as to merely bend or arch the applied fibers back into the base structure, without entirely flattening them and without destroying the numerous air voids between the same, indicated in the drawing in a general way at 5.

What is claimed is:

1. The herein disclosed process of making a material useful as a leather substitute, comprising impregnating a woven fabric and a layer or layers of wadding, felt, or low density alpha cellulose paper on one or both sides of said fabric with a solution of vulcanizable rubber compound under pressure and tension, drying, pressing to amalgamate and smooth the surface layer or layers into a mass or masses of matted rubber compound filmed arched fibers with air spaces therebetween and vulcanizing.

2. The herein disclosed process of manufacturing material useful as a leather substitute, comprising running a woven fabric on a cylinder or Fourdrinier of a paper machine after the first alpha cellulose fibers have been formed thereon and causing the paper formation to continue over said fabric to produce in assembled relation a base of woven fabric between sheets of loose, low gravity alpha cellulose paper and tensioning and saturating the same under pressure with rubber compound.

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