

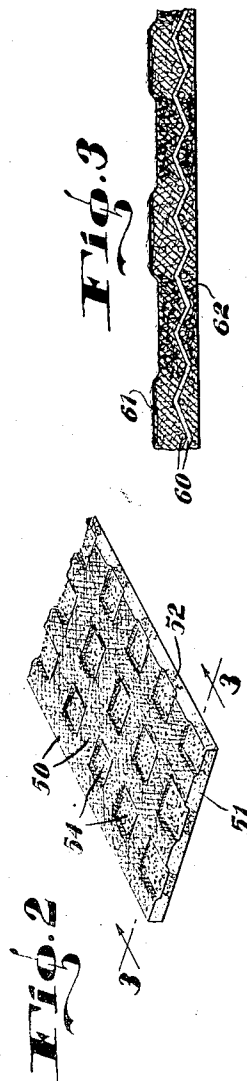
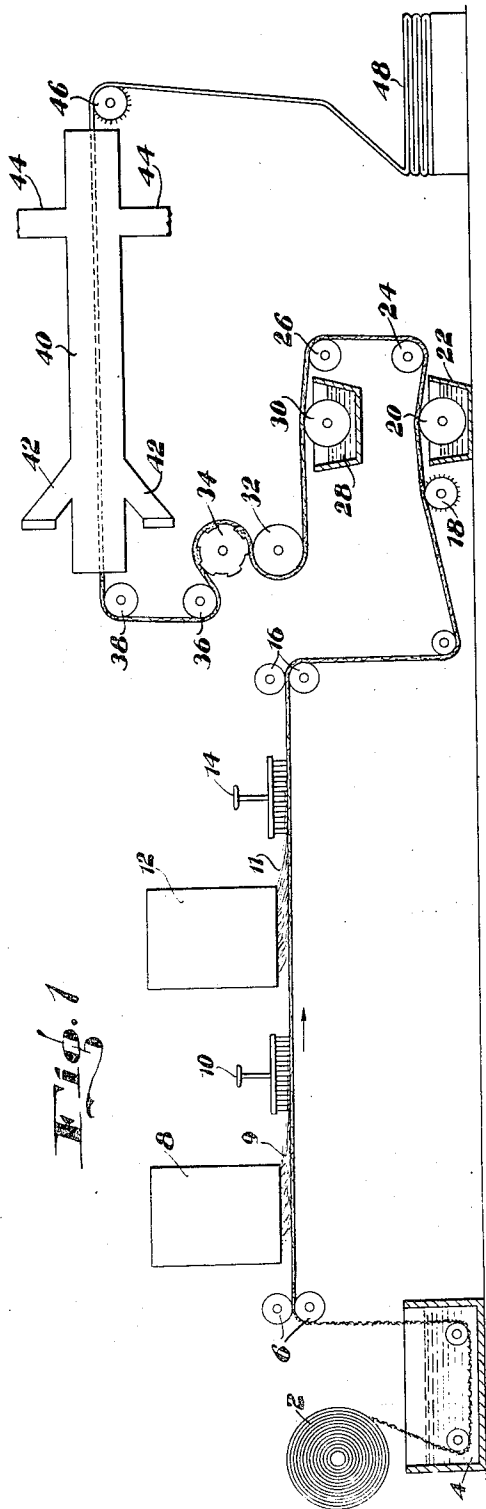
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FLOOR COVERING AND METHOD OF MANUFACTURE

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FLOOR COVERING AND METHOD OF
MANUFACTURE

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This invention relates to needled fabrics useful as inexpensive floor coverings and particularly as underlays for the more expensive floor coverings and to methods of producing the same.

The object of the present invention is to provide an underlay composed of inexpensive vegetable fibers, such as jute, hemp or the like, which has a lasting resiliency, flexibility and resistance to wear hitherto obtainable only in an underlay made chiefly or entirely of animal fibers, that is, hair or wool.

I have found what I believe is a novel way of imparting to a needled fabric, particularly of vegetable fibers, a permanent resiliency by impressing it in selected areas after coating it with certain binding materials as hereinafter described, wherein binding material is dispersed through the fibers under those areas and the adjacent portions are substantially uncompacted and retain their natural resiliency which endures in practical use.

In the accompanying drawing, Fig. 1 is a diagrammatic view of the various steps in the process comprising the preferred embodiment of my invention. Fig. 2 is a perspective view of a portion of the finished underlay. Fig. 3 is an enlarged section on line 3—3 of Fig. 2.

Referring first to Figs. 2 and 3, the underlay shown is composed of a loosely woven backing fabric 60, such as burlap, and of vegetable fibers, such as jute, needled into and through the burlap so that they cover the burlap with a top layer 61 and a bottom layer 62. The top layer is impressed in selected areas, that is, it has compacted portions 54 located between higher portions or ridges 50. The bottom of the bottom layer may be smooth as shown, or impressed like the top layer. Certain binding materials, consisting preferably of paraffin mixed with other materials and applied in the manner to be described, impart the desired permanency to the impressions and to the ridges between them.

The preferred method of producing the fabric of Figs. 2 and 3 is illustrated in Fig. 1. As shown, the loosely woven backing fabric, such as burlap or the like, is passed through a suitable sizing bath, such as starch cooked in water, in tank 4, to impart stiffness to the backing fabric. The fabric is squeezed between rolls 6 to remove surplus sizing material. It passes under a fiber dispenser 8, such as a Garnette machine, which deposits on it a bat 9 composed entirely or chiefly of vegetable fibers, such as jute or the like. A needling machine 10 needles the jute into and through the burlap. If desired, a second bat of

jute may be added at 11 by a Garnette 12 and needled into the fabric by the needling machine 14. The squeeze rolls 16 compact the fabric thus made. A power driven spike roll 18 draws the fabric through the preceding devices and delivers it to the coating means.

From the spike roll 18 the fabric passes up over an application roll 20 dipping into a tank 22 containing a back coating material comprising principally starch and if desired a dye. The starch binds the jute fibers together and to the burlap and imparts such stiffness to the entire fabric as to give it the proper handle. To counteract any tendency of the fabric to adhere to the steam heated roll 32 over which it subsequently passes, I preferably add to the back coating bath a lubricant such as paraffin or the like.

As an example of suitable ingredients for the bath of back coating material and a preferred manner of preparing the same, I first melt together 10 pounds of paraffin and 1 pound of stearic acid to which I add 1.5 gallons of water and $\frac{1}{2}$ pint of ammonia at about 130° F. In a separate container I prepare 20 pounds of starch cooked thin with 1 pint of enzyme in 3 gallons of water to which are added 12 ounces of Erie brown dye. The starch and paraffin mixtures are then mixed together with 12 gallons of water and with a suitable foaming agent, such as 1.5 pounds of "Gardinol", a sulphate of technical lauryl alcohol. The mixture is then fluffed up to about 40 gallons with a high speed mixer and thickened with 2 pounds of karaya gum which is effective to stabilize the resultant foam.

The fabric is next guided over suitable idler rolls 24 and 26 to present its upper surface to an application roll 30 which dips into tank 28 containing a face coating material and preferably a dye.

The face coating material consists chiefly of paraffin. A preferred example is as follows: 30 pounds of paraffin and 3 pounds of stearic acid are melted together, to which are added 4.5 gallons of water and $\frac{1}{2}$ pint of ammonia at about 130° F. To the resultant mixture are added 12 ounces of Erie brown dye, 12 gallons of water and 1.5 pounds "Gardinol." The mixture is then fluffed up to about 40 gallons with a high speed mixer and thickened and stabilized with 2 pounds of karaya gum.

I have found that by fluffing the mixtures of both the back and face coating materials, as above described, I incorporate air as a carrier and thereby obtain a low concentration and even distribution of the materials. I can therefore use

a minimum of water so that the fabric can later be readily dried. Also the amounts of paraffin and starch with which the fabric is coated and in part impregnated as later described are materially reduced so that the fabric is rendered soft and pliable without brittleness or a papery handle.

The fabric, while still wet, is next passed between rolls 32 and 34 which are steam heated to a temperature of approximately 300° F. The paraffin, which is present in the upper and bottom surfaces of the fabric, acts as a lubricant and prevents the fabric sticking to the rolls.

The lower roll 32, which engages the back of the fabric, has preferably a plain surface. The upper roll 34 has on its surface low projections to impress selected areas of the fabric and to compact the fabric in those portions, as illustrated at 54 in Fig. 2.

The pressure of the projections causes the paraffin to be dispersed through the fabric in the compacted portions while the paraffin on the surfaces of the adjacent uncompact higher portions 50 is left on those surfaces without substantial diffusion through those portions.

The wet fabric retains its impressions while guided over idlers 36 and 38 and drawn by a spike roll 46 through a hot air dryer 40. The latter has suitable hot air inlets 42 and outlets 44 to maintain a proper drying temperature, such as approximately 180° F. The drying of the fabric is accelerated and facilitated by the water content being kept low as above described.

The fabric, as it emerges from the dryer, is still impressed with compacted portions in which the paraffin is dispersed and with uncompact higher portions in which the paraffin is entirely, or almost entirely, on the surface. As the fabric cools, the paraffin sets so that the compactness of the impressed portions is made permanent, to last for a long period of time, and the adjacent uncompact portions in which the paraffin is present only on their surfaces have the natural resiliency of the fibers of jute, or other fibers, of which it is composed without having that resiliency impaired by paraffin. The compacted portions also serve to support the adjacent uncompact portions when the fabric is walked upon.

The back and face coating materials set forth above include a dye as one ingredient and I have found that pleasing color effects are obtained by my novel treatment when the baths include a dye. The back of the fabric will be of uniform shade but the dye applied to the face, like the paraffin, penetrates and is diffused through the compacted portions 54 so that the surfaces of those portions are appreciably lighter in shade than the surfaces of the uncompact portions 50 where the dye is left in its full strength.

My invention is not, of course, to be limited to the specific ingredients or formulas set forth above as they are given only by way of example. Thus latex can be a chief ingredient in one or both of the coating materials, but, where latex is used, a lubricant, such as a paraffin emulsion, should be employed with it to prevent the latex or latex impregnated fibers from adhering to the steam heated rolls 52 and 34. As an example of a suitable formula of this type I may mix ten pounds of melted paraffin and 1 pound of stearic acid with 1½ gallons of water and ½ pint of ammonia at about 130° F. This mixture is then added to 5 gallons of compounded normal latex, brought up to 50 gallons with water and thickened with 6 pounds of karaya gum.

Nor is my invention to be limited, except as indicated in the appended claims, to the use of the vegetable fibers above noted or, indeed, to vegetable fibers of any sort, as the process herein disclosed may also be used where the fibers include other vegetable fibers, or animal fibers, such as wool or hair, or even mineral fibers, such as asbestos.

This application is a continuation in part of my prior application, Serial No. 212,951, filed June 10, 1938.

I claim:

1. A needled fabric adapted for use as a floor covering underlay composed of a loosely woven backing fabric and cellulose fibers needled through said fabric and forming layers of fibers, one on each face of the fabric, the layer on one side having compacted indented portions separated by relatively uncompact resilient portions, the compacted portions being permeated and stiffened by solidified paraffin, the body of the uncompact portions having substantially the natural resiliency of the cellulose fibers, being substantially unimpregnated by any stiffening agent, and having only on its exposed surface a coating consisting chiefly of paraffin, the compacted portions being so closely adjacent to one another as to afford support to the adjacent intermediate uncompact portions and to restrain the latter from spreading under the pressures applied to them in the use of the needled fabric on the floor.

2. A needled fabric adapted for use as a floor covering underlay composed of a loosely woven backing fabric and cellulose fibers needled through said fabric and forming layers of fibers, one on each face of the fabric, the layer on one side having an exposed surface coated with a sizing material and paraffin, the layer on the other side having compacted indented portions separated by relatively uncompact resilient portions, the compacted portions being permeated and stiffened by solidified paraffin, the body of the uncompact portions having substantially the natural resiliency of the cellulose fibers, being substantially unimpregnated by any stiffening agent, and having only on its exposed surface a coating consisting chiefly of paraffin, the compacted portions being so closely adjacent to one another as to afford support to the adjacent intermediate uncompact portions and to restrain the latter from spreading under the pressures applied to them in the use of the needled fabric on the floor.

3. The method of producing a needled fabric adapted for use as a floor covering underlay which comprises needling a bat of cellulose fibers to a loosely woven backing fabric, advancing continuously the needled fabric thus produced and, during such continuous advancing, coating one surface with a frothed, aqueous mixture containing paraffin as a chief ingredient, indenting in selected areas the last-named surface of said fabric, leaving unindented portions between the indented portions, while simultaneously lubricating said surface by heating the paraffin and permeating the indented portions with said paraffin, said indented portions being so closely adjacent to one another as to afford support to the adjacent intermediate unindented portions and to restrain the latter from spreading under the pressure applied to them in the use of the needled fabric when the paraffin has solidified, and then drying and cooling the fabric to solidify the paraffin and stiffen the indented portions.

4. The method of producing a needled fabric adapted for use as a floor covering underlay which comprises needling a bat of cellulose fibers through a loosely woven backing fabric, advancing continuously the needled fabric thus produced, and, during such advancing, coating one surface with a frothed, aqueous mixture containing a sizing and paraffin, coating the other surface with a frothed, aqueous mixture containing paraffin as a chief ingredient, indenting in selected areas the last-named surface of said fabric, leaving unindented portions between the

indented portions, while simultaneously lubricating said surfaces by heating the paraffin and permeating the indented portions with said paraffin, said indented portions being so closely adjacent to one another as to afford support to the adjacent intermediate unindented portions and to restrain the latter from spreading under the pressure applied to them in the use of the needle fabric when the paraffin has solidified, and then drying and cooling the fabric to solidify the paraffin and stiffen the indented portions.

HENRY A. REINHARDT.