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R. G. KNOWLAND ET AL

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Fig. 1

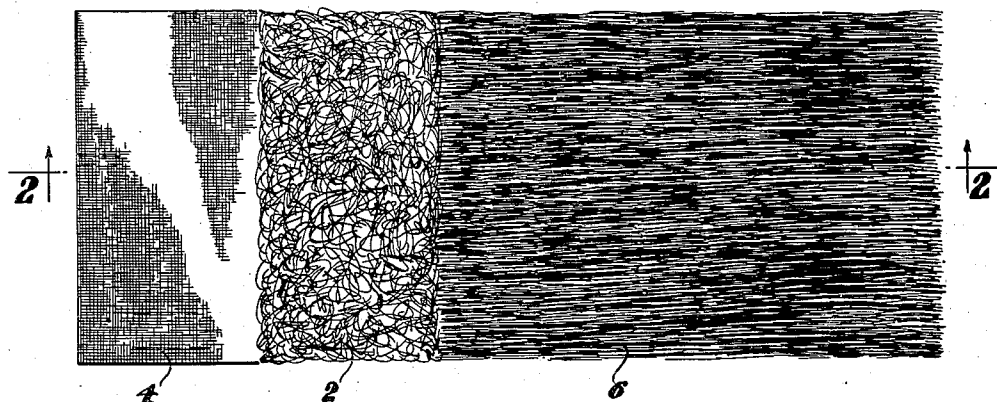
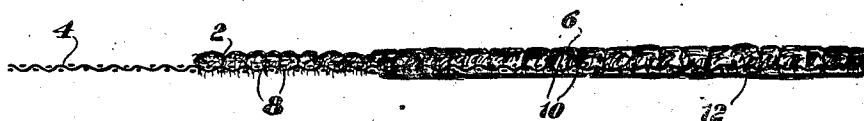


Fig. 2



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1 Claim. (Cl. 28—79)

This invention has for its object the production of a fabric which may be made at low cost and which has the combined properties of resiliency, a soft feel and high resistance to abrasive wear. Our fabric has proven to be well adapted for use as floor coverings, automobile body paneling and the like where such properties are particularly required and have heretofore been obtained only in expensive woven pile fabrics.

The fabric of our invention is formed preferably of three layers, a backing layer such as burlap, an intermediate cushioning layer of an inexpensive material, such as a blended mixture of shredded jute strings, felt cuttings, dark virgin jute, reworked gunny sacking and the like, and a surface layer of an extruded filament having certain definite characteristics, to be hereafter more fully specified, disposed to cover completely the cushion layer. The several layers of our fabric are securely bound together in such a way, preferably by needling, that the properties of cushioning resilience and of high resistance to wear are obtained.

A preferred embodiment of our invention is illustrated in the drawing, in which Fig. 1 is a plan view of the fabric broken away to show the several layers of which it is composed, and Fig. 2 is a vertical section through the fabric on the line 2—2 of Fig. 1.

In making our fabric a layer of resilient cushioning material 2, preferably a blended mixture of such material as jute strings, felt cuttings, dark virgin jute, reworked gunny sacking, or the like, shredded by a garnet, is deposited on the backing 4, which may be a woven burlap. In practice, we have used successfully approximately two ounces per square foot, or about twelve pounds for a fabric nine by twelve feet. The material is secured to the backing by needling, as indicated at 8. The resiliency of the layer 2 may require two needling operations to secure it to the backing.

On the layer 2 we deposit from a garnet a surface layer 6 of extruded filaments, preferably rayon, cut into staple length, preferably approximating $3\frac{1}{2}$ inches. The length may vary depending upon the thickness of the fabric being made, but it should be at least twice the thickness of the finished fabric and preferably greater. For a finished fabric which is approximately $\frac{1}{4}$ inch thick, we have used successfully a rayon mix consisting of 50% staple $3\frac{1}{2}$ inches in length and the balance a waste rayon of staple length approximating $1\frac{1}{2}$ inches. These

figures may, of course, be varied. The denier of the rayon may also vary, but we prefer deniers ranging from 4 to 25 and we have successfully used in practice a $5\frac{1}{2}$ denier high grade viscose rayon of which "Cisalpa" is an example. The rayon fibers should be of minimum stiffness and brittleness. Taking the elongation at break as a criterion of these qualities, such elongation should exceed 8%.

The rayon layer 6 is needled through both the intermediate layer 2 and the backing fabric 4, as indicated at 10. Usually a single needling operation will suffice.

We have found in practice that the cushioning layer 2 forms an excellent binding medium for the rayon staple and is conducive to an effective needling of the rayon despite the inherent slipperiness, flexibility and softness of the latter, all of which properties, however, contribute to the desired qualities of the finished fabric. The finished fabric is highly resistant to abrasive wear and yields an exceptionally small amount of fluff to a vacuum cleaner.

Where the finished product is to be used as a floor covering, we prefer to coat the back with an adhesive material, preferably adapted to penetrate only into the backing and not into the cushioning layer 2. Such adhesive may desirably consist of a rubber size consisting of a dispersion in water of 40% dry solids, having by weight one part reclaimed rubber and one part clay. The size securely bonds the fibers with which it contacts, namely, that portion of the fibers of the layers 2 and 6 which have been needled through to protrude on the under surface of the backing 4. By using an adhesive which does not penetrate into the cushion layer 2, we insure preservation of the desired resiliency of the cushion layer.

The fabric may be readily printed on its tread surface 6 and we have found it to be excellently adapted for bright and clear printing with dyes of an inexpensive grade.

The fabric thus produced has a soft, cushiony feel adapting it for use as floor coverings, automobile door panelings, and the like, and has an exceptionally high resistance to abrasive wear. The specified suppleness and high tensile strength of the rayon permit it to yield and bend without breaking during the needling operation so that the rayon fibers are preserved substantially intact.

It is a feature of our invention that the cushion layer 2 not only contributes greatly to the desired resiliency, but so binds the needled rayon

staple as to obviate the need for impregnating the entire fabric with adhesive and it thereby avoids any diminution of its cushiony feel and any imparting of a dull appearance to the top surface which would impair the clarity of printing. The compactness of the cushion layer resulting from the needling and maintained by the confining rayon fibers contributes to the ability of the cushion layer to grasp the rayon fibers which penetrate it.

The specific details of our preferred embodiment above described can be variously modified to suit the needs of individual users without departing from the spirit of our invention, which is to be limited only as the appended claim requires. Thus, both layers can be needled simultaneously rather than independently as above described. In place of rayon other extruded filaments, such as those made from casein, soy bean and the like, may be used, provided they have the characteristics of elasticity, tensile strength, slipperiness, etc., inherent in a good grade of rayon. The fibers of the cushion layer, on the contrary, should not be an extruded filament, but should be of a lofty material considerably less slippery than rayon and compacted

into a tangled mass with which the extruded filament fibers which penetrate it from above can combine in the manner described.

We claim:

- 5 As an article of manufacture, a needled fabric having a prefabricated backing, a layer of lofty shredded material deposited on the backing, a tread layer of non-felting extruded fibers composed substantially entirely of rayon capable of
10 an elongation at break exceeding 8%, said shredded material being needled through the backing to present fibers of the shredded material on the exposed surface of the backing, the extruded filament being needled through both
15 the shredded material and the backing to present fibers of extruded filament on the exposed surface of the backing, and a coating of adhesive on the under surface of the backing securing the fibers of the shredded material and the rayon
20 which are thus presented on the external surface of the backing, the said layer of shredded material being substantially free of said adhesive material.

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