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3,817,817

NEEDLEBONDED SECONDARY BACKING FOR CARPETING

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Fig. 1

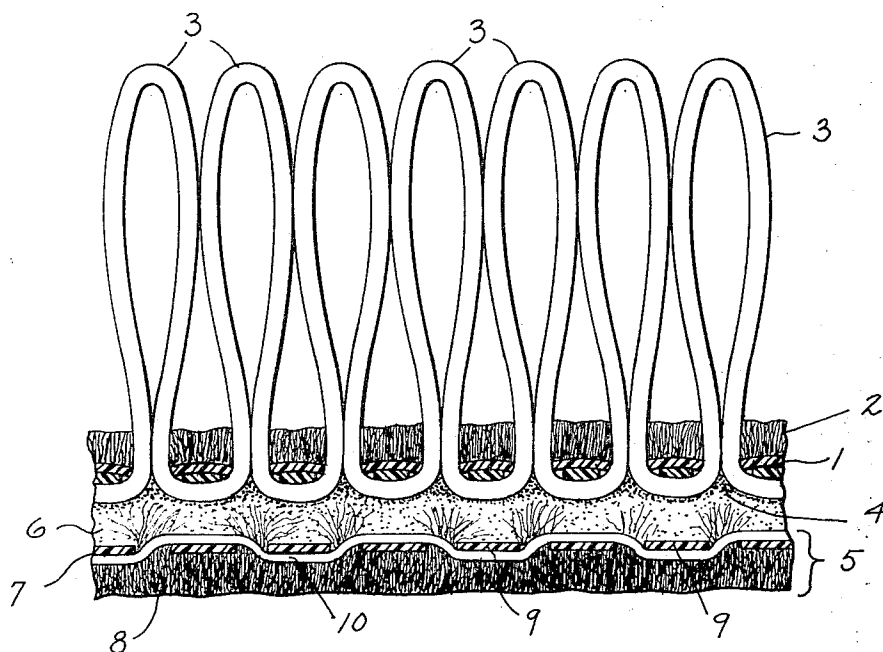


Fig. 2

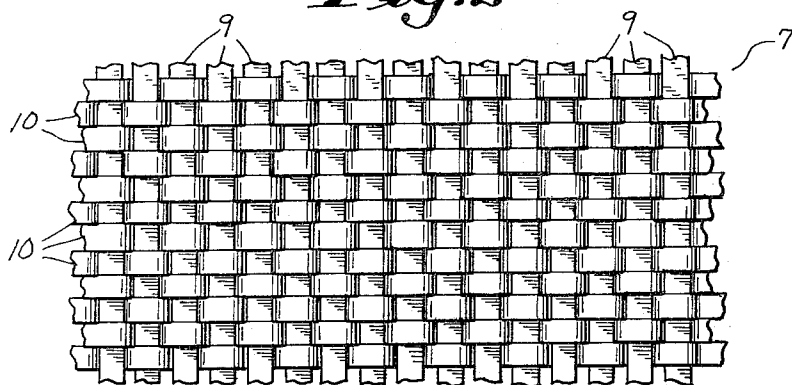
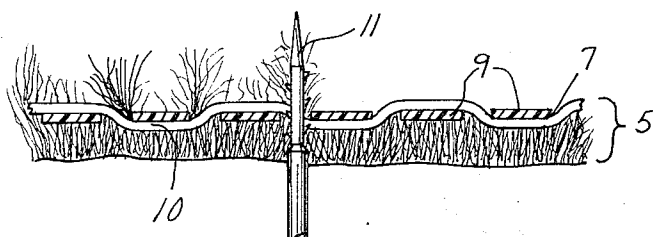


Fig. 3



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NEEDLEBONDED SECONDARY BACKING
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2 Claims

ABSTRACT OF THE DISCLOSURE

A secondary backing for carpeting comprises a woven synthetic scrim with a layer of staple fibers needled onto its bottom surface with portions of the fibers projecting through the top surface. The resulting product has a pleasing appearance and hand, is durable, versatile and relatively inexpensive, and may easily be adhered to the carpet proper.

BACKGROUND OF THE INVENTION

This invention relates to the manufacture of carpeting, and particularly to a synthetic secondary backing for carpeting. It is often desirable to apply a secondary backing to the bottom surface of carpet material to add dimensional stability, weight and durability. Secondary backing materials have traditionally been made of woven jute, but due to the difficulties in obtaining a reliable source of jute and its highly variable cost, manufacturers have sought for some time to find a suitable replacement.

One material that has many of the requisite physical properties for secondary backing and is available at a reasonable price is woven synthetic scrim of the type now commonly used for primary backings; but a number of factors have heretofore mitigated against the use of this material for secondary backings. For one thing, the synthetic filaments are smooth and slippery, making it difficult to bond the scrim to the underside of the carpeting. The same slipperiness makes woven synthetic scrims, particularly those with ribbon filaments, subject to edge raveling so that they are somewhat difficult to handle. Also, the shiny appearance and smoothness of synthetic scrims detracts from their marketability since customers are accustomed to the appearance and hand of jute backing. Further, where high weight secondary backing is necessary or desirable the synthetic scrim material can become quite expensive.

U.S. Pat. No. 3,542,632, issued Nov. 24, 1970, discloses a method for improving the hand and adherability of synthetic scrim material by needling or otherwise treating it to develop fibrils or splinters. While this does improve the characteristics of the scrim, there are still significant problems. For example, it is necessary to use a relatively heavy, and therefore expensive, material in order to have sufficient strength remaining after fibrillation and in order to give the desired final weight. Also edge raveling may remain a problem unless the material is severely fibrillated and/or subjected to a heat treatment. Further, the fibrillated material retains much of the translucent, shiny appearance of the basic scrim.

SUMMARY OF THE INVENTION

It is the general purpose of this invention to provide an improved synthetic secondary carpet backing comprised of a woven synthetic scrim with staple fibers needled onto its bottom surface. Some specific objects and advantages of the invention are as follows:

(a) The resulting product has a highly satisfactory appearance and hand.

(b) Colored or easily dyeable fibers may be used so that the backing can have a color or be made to resemble jute.

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(c) The secondary backing of the invention has a high degree of dimensional stability, and the needled fibers are a significant factor in preventing edge raveling.

(d) The secondary backing material is relatively inexpensive, in that a light weight scrim material can be used, and the final weight can easily be controlled by varying the amount of staple fibers applied.

(e) The resulting product can be easily and securely bonded to the carpeting using presently available adhesives.

(f) If desired, flame retardant staple fibers can be used, thus improving the flammability characteristics of the final product.

Other objects and advantages will become apparent from the description to follow. In the description, reference is made to the accompanying drawing which shows, by way of illustration and not of limitation, a preferred embodiment of the invention.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is an enlarged, somewhat schematic fragmentary view in cross section of a piece of carpeting including a secondary backing formed according to the invention,

FIG. 2 is a fragmentary top plan view of the woven synthetic scrim material used in making the secondary backing shown in FIG. 1, and

FIG. 3 is an enlarged, somewhat schematic representation of the needling step in the manufacture of the secondary backing.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The carpet proper shown in FIG. 1 is of the type shown in U.S. Pat. No. 3,605,666, issued on Sept. 20, 1971 to Kimmel et al. and entitled "Tufted Carpet With Compatibly Dyeable Needlebonded Surface and Method of Manufacturing Same," to which reference may be had for a complete description. It includes a woven polypropylene scrim 1 of the conventional ribbon type, with a layer of dyeable staple fibers needled onto the top surface of the primary backing 1 to provide a dyeable subface 2. The carpet face proper is defined by a series of tufts 3 which extend up through the primary backing 1 and subface 2. The base portions of the tufts 3 are on the underside of the primary backing 1 and are preferably locked in place by a thin layer 4 of suitable latex or other adhesive. The tufts 3 may be of any desired length and density, and may be looped as shown or cut. Any suitable materials may be used for the subface 2 and tufts 3, but in the preferred embodiment they are compatibly dyeable.

While the secondary backing of this invention is particularly suitable for the particular type of tufted carpeting shown and described above, it will be obvious that it may also be used with other tufted carpeting, woven carpeting, or any other type of carpeting, and the particular type of carpeting is not part of the invention.

The secondary backing of the invention is designated generally by the reference numeral 5; and it is conventionally bonded to the underside of the carpet proper, usually as the last step in manufacture, by means of a suitable adhesive layer 6 which runs into the layer 4 and the bases of the tufts 3. The adhesive 6 may be of any suitable type, such as commercially available latex adhesives, and it is a particular advantage of the invention that common backing adhesives may be used to provide a secure bond.

The secondary backing 5 includes a scrim 7 and a backing face 8 of needled staple fibers. The scrim 7 is preferably a woven polypropylene ribbon scrim which is basically similar to the primary backing 1 but is of some-

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what lighter weight. In the preferred embodiment, the scrim 7 is made up of weft ribbons 9, which are of uniform size and cross section and slightly spaced apart eight to an inch, and warp ribbons 10, which are also of uniform size and cross section and are tightly spaced twelve to the inch. The resulting 12 x 8 construction weighs 2.75 ounces per square yard. It is a particular advantage of the invention that this type of well-known scrim may be used, but it will be obvious that scrims made of different polyolefins or other materials and having various configurations may be substituted.

The backing face 8 is applied to the bottom surface of the scrim 7—which corresponds to the bottom surface of the completed carpet—prior to attachment of the secondary backing 5 to the basic carpet. This is accomplished by an conventional needling process, such processes being well known to those skilled in the art. In the preferred embodiment, the staple fibers used are of polypropylene and have a weight of 15 denier with an average length of 1½ inches. They are deposited uniformly across the bottom surface of the scrim 7 at a rate of 1½ to 2 ounces per square yard. As illustrated by FIG. 3, needling is accomplished by means of standard barbed needles 11, only one of which is shown, which are punched in from the bottom surface of the secondary backing 5. In the preferred embodiment, the needling is (performed by using a suitable needle loom set at 234 punches per square inch with a punch depth of ⅝ of an inch. The needles 11 are preferably nine barb needles, size 15 x 18 x 20 x 3. It will be obvious that variations are possible in the types of fibers used, the rate at which they are applied, and the extent to which they are needed, bearing in mind the desired results discussed more fully below.

The needling step causes the staple fibers to be interlaced to develop the backing face 8, which is on the bottom surface and provides a very pleasing appearance and hand to the finished carpet product. If desired, colored or dyeable staple fibers can be used so that the face 8 can be made to resemble jute or have a desired color. The weight of the secondary backing 5 as a whole can easily be controlled by varying the deposit rate of staple fibers, and the amount of fiber used and the extent to which it is needed can be varied to change the appearance of the final product as desired. If desired, flame retardant fibers such as wool may be used for the backing face 8, and these will serve to improve the flammability characteristics of the finished carpeting as a whole.

During the needling step, the needles 11 actually extend up through the scrim 7 as illustrated in FIG. 3, and as a result portions of the fibers project through and extend above the scrim 7 after needling. This is important for several reasons. First, the fibers are thus woven around the filaments of the scrim 7 which is quite helpful in preventing edge raveling. Also, the portions of the fibers which extend above the scrim 7 are encapsulated in the adhesive layer 6 thus significantly improving the adherability of the secondary backing 5.

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Having the needles 11 extend through the scrim 7 necessarily results in some fracturing or fibrillation of the scrim 7. This is characteristic of needling operations and also occurs, for example, when the subface 2 is needled onto the primary backing 1. In the embodiment described, however, the face 8 is needled somewhat more than would otherwise be necessary, to insure that substantial portions of the fibers forming the layer 8 are pushed up through the scrim 7 and also to develop some fibrillation (not illustrated in the drawing for reasons of clarity and simplicity). The upwardly projecting fiber portions and the fibrils are both encapsulated in the adhesive layer 6 to insure adhesion with presently available adhesives. It is important to note, however, that adhesion is not completely dependent on scrim fibrillation, and that the hand and appearance of the finished product result from the face 8 rather than fibrillation. As a result it is possible with the present invention to use relatively light and inexpensive scrim materials and still provide an improved product.

Needlebanded secondary backing formed according to this invention has proven to be highly satisfactory from the standpoints of appearance, strength, cost, durability and adherability, and the process described is easily adaptable to a wide variety of applications. While a preferred embodiment of the invention has been shown and described, it will be understood that various modifications might be made without departure from the spirit of the invention. The invention is not, therefore, intended to be limited by the showing or description herein, or in any other manner, except as may specifically be required.

What is claimed is:

1. In carpeting having a secondary backing secured to its underside by an adhesive layer, the improvement wherein the secondary backing comprises: a woven synthetic scrim; and a backing face comprising a layer of staple fibers needled onto the bottom surface of the scrim with portions of the fibers extending upwardly through the scrim and encapsulated in the adhesive layer.

2. Carpeting according to claim 1 wherein: the scrim is woven of ribbon filaments of a polyolefin material and has a weight of approximately 2.75 ounces per square yard; and the backing layer has a weight of approximately 1.5 to 2.0 ounces per square yard.

References Cited

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MARION E. McCAMISH, Primary Examiner

U.S. Cl. X.R.

156—60; 161—62, 81