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Maige

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[54] **TUFTED PILE PRODUCT**

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[52] **U.S. Cl.** **161/62,** 117/19, 117/25, 117/33, 156/72, 156/148, 156/279, 161/64, 161/67

[51] **Int. Cl.** **D03d 27/00,** D04h 11/00

[58] **Field of Search** 161/62, 64, 67; 156/72, 148, 279; 117/19, 25, 33

[56] **References Cited**

UNITED STATES PATENTS

3,672,929 6/1972 Riordan 161/64

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Assistant Examiner—M. E. McCamish
Attorney—Martin Fleit et al.

[57] **ABSTRACT**

A tufted pile product having a woven polypropylene fabric with a flock adhered to one side thereof and pile extending through the fabric from the opposite side thereof to form a product wherein the flock and the pile cover one side of the polypropylene fabric to provide a pleasing visual effect.

16 Claims, 3 Drawing Figures

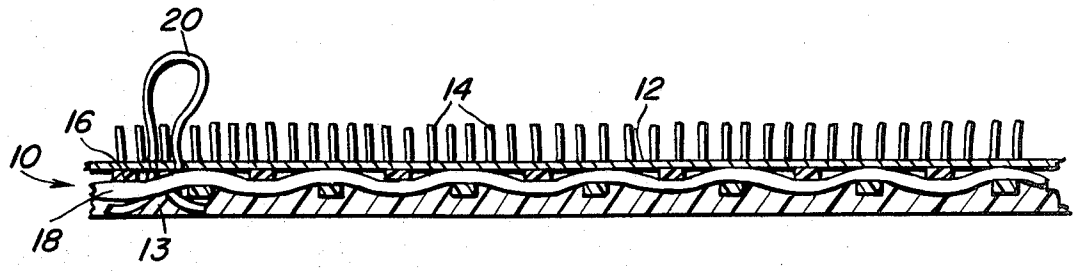


Fig. 1

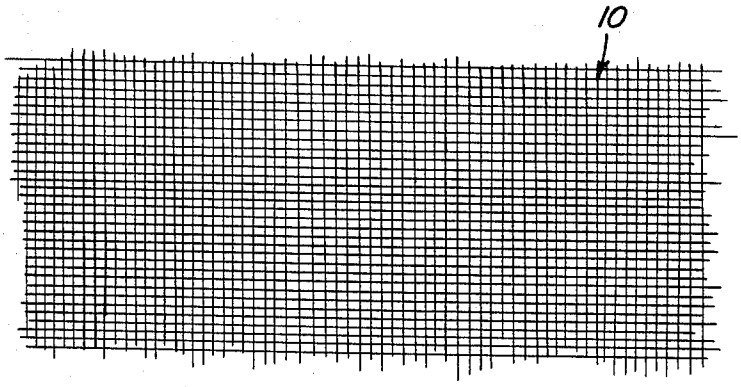


Fig. 2

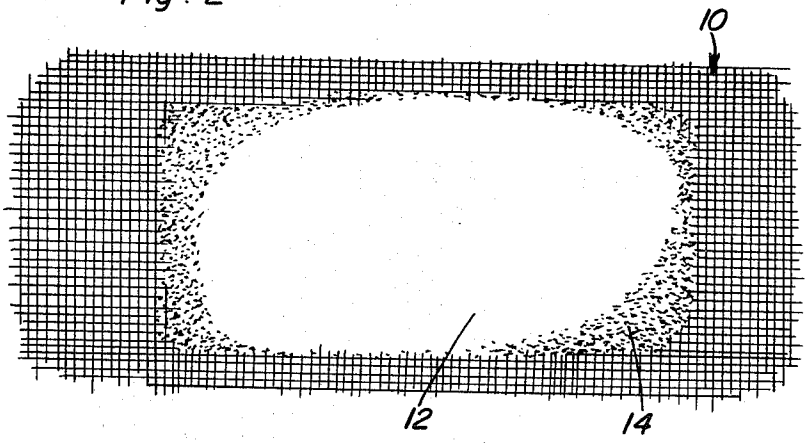
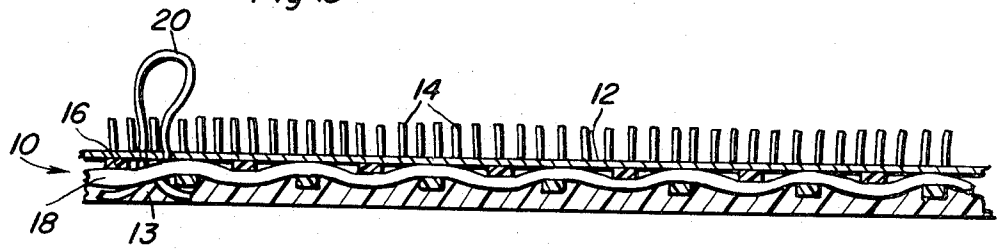


Fig. 3



TUFTED PILE PRODUCT

This invention relates to a tufted pile product, and more particularly to a tufted carpet or rug having flock adhered to one side of a woven polypropylene fabric. Pile extends through the fabric to form a product wherein the flock and the pile cover one side of the fabric to provide a pleasing visual effect.

In the past, numerous articles of different types have been coated with flock. For example, Stephens et al. U.S. Pat., No. 3,565,742 describes a flocked golf green that exhibits responses to a golf ball similar to natural turf. Various types of flock material were applied and bonded to various backing materials in the Stephens et al. patent to provide the desired result. Grundman U.S. Pat. No. 3,436,245 also relates to a flock coated substrate wherein the flock fibers are firmly held in place while a permanent settable adhesive is applied. The permanent settable adhesive is applied through the porous, open back side of the substrate to firmly bond the adhered ends of the flock fibers. In addition, various types of tufted carpet have been developed, such as described in Schwartz et al. U.S. Pat. No. 3,359,934 and in Chopra U.S. Pat. No. 3,443,541.

However, a persistent problem in the carpet and other tufted pile product arts has been the fact that the carpet backing is frequently visible through the carpet tufting in an undesirable manner. This problem has been emphasized where polypropylene is used as the backing, since the carpet tufting frequently does not cover the entire backing area and a "glare" from the polypropylene is frequently visible through the tufting. This, of course, is an undesirable effect and makes the carpet appear worn, thin, and poorly made.

Although the prior art shows various methods of flocking for different purposes and various tufted carpet constructions, the problem of carpet backing being visible through the carpet tufting has persisted.

It is, therefore, an object of the present invention to provide a tufted pile product which is pleasing to the eye.

Another object is to provide a tufted pile product wherein the backing is hidden from view by pile and by flock adhered to the backing.

A further object of the invention is the provision of a method for manufacturing a tufted pile product wherein pile and flock are positioned on one side of a backing fabric to provide a pleasing visual effect.

Additional objects and advantages of the invention will be set forth in part in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages are realized and attained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

To achieve these and other objects, the present invention provides a tufted pile product having a woven fabric of polypropylene, an adhesive material bonded to one side of the fabric, flock covering the adhesive material and bonded thereto and pile extending through the fabric to form a product wherein the flock and the pile cover one side of the fabric to provide a pleasing visual effect and to hide the polypropylene fabric from view.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are not restrictive of the invention.

The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate an example of a preferred embodiment of the invention and, together with the description, serve to explain the principles of the invention.

FIG. 1 is a top plan view of the polypropylene fabric used in the tufted pile product of this invention;

FIG. 2 is a top plan view of the polypropylene fabric having an adhesive material bonded over a predetermined portion thereof and flock bonded to a selected area of the adhesive; and

FIG. 3 is a diagrammatic cross-sectional view of the tufted pile product of this invention.

With reference now to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there is shown in FIG. 1 a woven fabric **10** of polypropylene. The polypropylene is preferably extruded in the form of a ribbon or filament, and the polypropylene fabric is used as the primary backing for the tufted pile product of this invention, although fabric made from other materials, either natural or synthetic, can be used.

FIG. 2 shows polypropylene fabric **10** with an adhesive material **12** bonded to one side of the fabric and flock **14** covering the adhesive material and bonded thereto. Flock **14** is illustrated in FIG. 2 as covering only a portion of adhesive **12** for the purpose of explanation only. In actual practice, the flock is uniformly applied over the entire adhesive area.

As illustrated in FIG. 3, the polypropylene fabric **10** is comprised of weft ribbons or filaments **16** and warp ribbons or filaments **18.** Adhesive **12** is applied to one side of fabric **10** and flock **14** is bonded to adhesive **12.** In addition, pile **20** extends through fabric **10** from the side opposite from adhesive **12** to the side of the fabric on which adhesive **12** is located. A layer **13** of conventional material may also be applied, if desired, to the opposite side of fabric **10** as a secondary backing. This feature, however, forms no part of the invention.

Thus, a tufted carpet or tufted pile product is provided wherein flock **14** and pile **20** cover one side of fabric **10** to provide a pleasing visual effect and to prevent viewing of fabric or backing **10** from the flocked side of the backing.

Flock **14** can be a natural fiber (not dyed) or a predyed fiber. When a natural fiber flock is used, a natural yarn may be used for pile **20,** and the pile yarn and the flock may be composed of the same generic fiber. A product so formed can then be dyed to provide the uniform color desired with respect to the flock and the pile.

Of course, flock **14** may vary in generic class from the material used in pile **20** and with proper dye selection, desirable contrast between pile **20** and flock **14** can be achieved. If a dyed flock is applied to adhesive **12,** pile **20** can be formed from stock-dyed yarns to produce the desired effects.

Any type of adhesive known to be useful for making flocked fabrics can be used as the adhesive in the present invention. However, tests and experience have shown that certain adhesives are preferable. For example, acrylic polymers and copolymers, and especially acrylic copolymers having vinyl chloride, epoxy, vinylidene chloride or urethane segments have been found to be preferred. A vinyl chloride-acrylic acid copolymer

applied from a water-based emulsion has proven to be very successful. A combination of polyether polyurethane with an arcylic acid and acrylate applied from a water-based emulsion has also proved successful, as have various acrylic polymers adjusted to a viscosity of 18,000 centipoise.

Some of these adhesives are available in an unadjusted form from commercial houses as Geon manufactured by B. F. Goodrich Chemical Co., and specific examples are Geon 460X2 and Geon 450X32. Copolymers of butadiene and acrylonitrile known as Hycar can also be used as the adhesive. Hycar is manufactured by B. F. Goodrich Chemical Co. and specific examples are Hycar 2679X6 and Hycar 2600X131. Nyathane WS70 may also be used. Additives to the adhesive may include thickeners such as Carbopol 934, which is a synthetic hydrophilic colloid in the form of a free-flowing powder made by B. F. Chemical Co., Bentone 38, which is an organic derivative of a special magnesium montmorillonite supplied as a fine, creamy-white powder by Baroid Division, National Lead Co., or Titanium Oxide.

Flock **14** can be comprised of a number of materials. For example, the flock may be a polyester, polyamide, acrylic, polyethylene, polypropylene, cellulosic, or natural fiber. The natural fibers may be, for example, wool, rabbit, fur, or silk. In addition, in colored flock, rayons and nylons, for example, may be used.

Various sizes of flock can be used, and lengths of from ⅛ inch to ½ inch have proven to be desirable. In addition, in the natural nylon range, for example, flock sizes have been used of 15 denier and 6 denier.

It should be understood that flock other than in fibrous form may be used. For example, powder material may be used as the flock with equally successful results.

In manufacturing the tufted pile product or carpet of this invention, woven polypropylene fabric **10** is first placed in position for receiving adhesive material **12.** The adhesive may be an acrylic polymer, for example, and the polymer is preferably a copolymer containing a vinyl chloride, urethane, epoxy, or vinylidene chloride group. The adhesive material, containing approximately 50% solids, is then applied wet to one side of fabric **10** by a knife blade or pad (not shown). The adhesive is preferably applied to the fabric to a thickness of from 0.004 inch to 0.012 inch, and the level of wet application may be varied but 0.008 inch has provided excellent results.

Flock **14** is then applied uniformly to adhesive material **12** by well-known vibration methods, electrostatic methods or other methods or by combinations thereof. Adhesive **12** with flock **14** thereon is then cured by drying the adhesive and by subjecting the adhesive to a temperature, for example, between 225° F and 275° F for a period of **5** minutes. Temperatures and time of cure, however, may vary with thickness of adhesive film, type of adhesive and density of flock. Pile **20** is then caused to pass through fabric **10** as well as through adhesive **12** and through flock **14** to form tufts on the same side of the fabric as flock **14.** Following the curing step, excess flock **14** is removed by vacuum, vibration, or a combination of these methods.

The present invention, thus, provides for a unique tufted pile product and for a unique method of manufacturing a tufted pile product wherein the product has pile and flock positioned on one side of a woven polypropylene fabric to hide the fabric backing from view and to provide a pleasing visual effect.

The invention in its broader aspects is not limited to the specific details shown and described and departures may be made from such details without departing from the principles of the invention and without sacrificing its chief advantages.

What is claimed is:

1. A tufted pile product, comprising:
a woven fabric of polypropylene;
an adhesive material bonded to one side of said fabric;
flock covering said adhesive material and bonded thereto; and
pile extending through the fabric to form a product wherein the flock and the pile cover said one side of said fabric to provice a pleasing visual effect.

2. A product as in claim **1** wherein the woven fabric is comprised of polypropylene ribbons.

3. A product as in claim **1** wherein the woven fabric is comprised of polypropylene filaments.

4. A product as in claim **1** wherein the flock and the pile are comprised of the same material.

5. A product as in claim **1** wherein the flock and the pile are of the same color.

6. A product as in claim **1** wherein the adhesive comprises an acrylic polymer.

7. A product as in claim **6** wherein said polymer is a copolymer containing a vinyl chloride, urethane, epoxy, or vinylidene chloride group.

8. A product as in claim **1** wherein said adhesive is from 0.004 inch to 0.012 inch thick.

9. A product as in claim **1** wherein the flock is nylon or rayon.

10. A product as in claim **1** wherein the flock is comprised of fibers from ⅛ inch to ½ inch long.

11. A product as in claim **1** wherein the flock is a powder material.

12. A method of manufacturing a tufted pile product, comprising the steps of:
positioning a woven polypropylene fabric;
applying an adhesive material to one side of the fabric;
applying a flock to uniformly cover said adhesive material;
curing the adhesive; and
passing pile through the fabric to form tufts on the same side of the fabric as said flock.

13. A method as in claim **12** further including the steps or removing excess flock.

14. A method as in claim **12** wherein said adhesive is heated to a temperature between 225° F and 275° F.

15. A method as in claim **14** wherein said adhesive is heated for 5 minutes.

16. A method of manufacturing a tufted pile product comprising passing pile through a woven polypropylene fabric having a layer of flock securely bonded thereto, said tufting being positioned on the same side of said fabric as said flock.

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