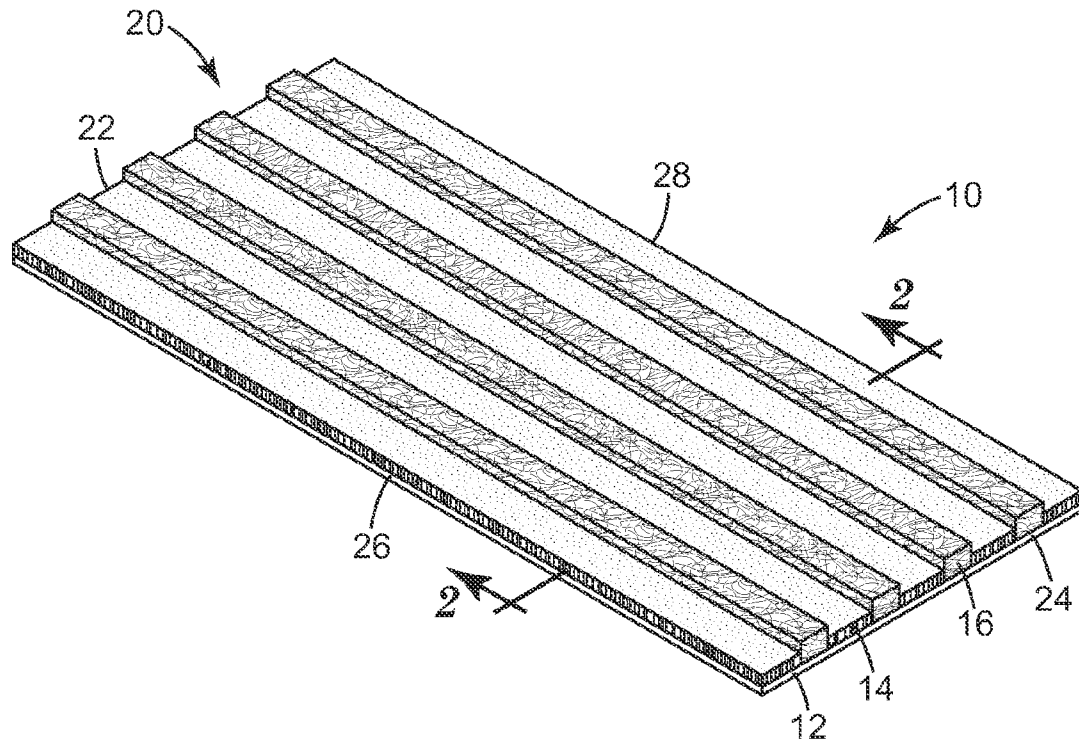




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(19) **United States**(12) **Patent Application Publication**
Kubes(10) **Pub. No.: US 2012/0060312 A1**(43) **Pub. Date: Mar. 15, 2012**(54) **CLEANING TOOL**(52) **U.S. Cl. 15/228**(75) **Inventor:** **Michael J. Kubes**, Oakdale, MN
(US)(57) **ABSTRACT**(73) **Assignee:** **3M Innovative Properties**
Company

Disclosed is a cleaning cloth that is constructed from a single yarn but has multiple cleaning functions. The cleaning cloth comprises base material, a looped pile formed of a yarn extending from the base material a first distance at a working surface, and a cut pile formed of the yarn extending from the base material a second distance at the working surface. The first distance is greater than the second distance by at least 0.5 mm. The longer looped pile is able to perform a sweeping action, while the shorter cut pile is a more dense arrangement of the fiber to capture and retain fine dust and debris. The disclosed cleaning cloth is therefore highly suitable for cleaning highly textured surface, such as tile floors.

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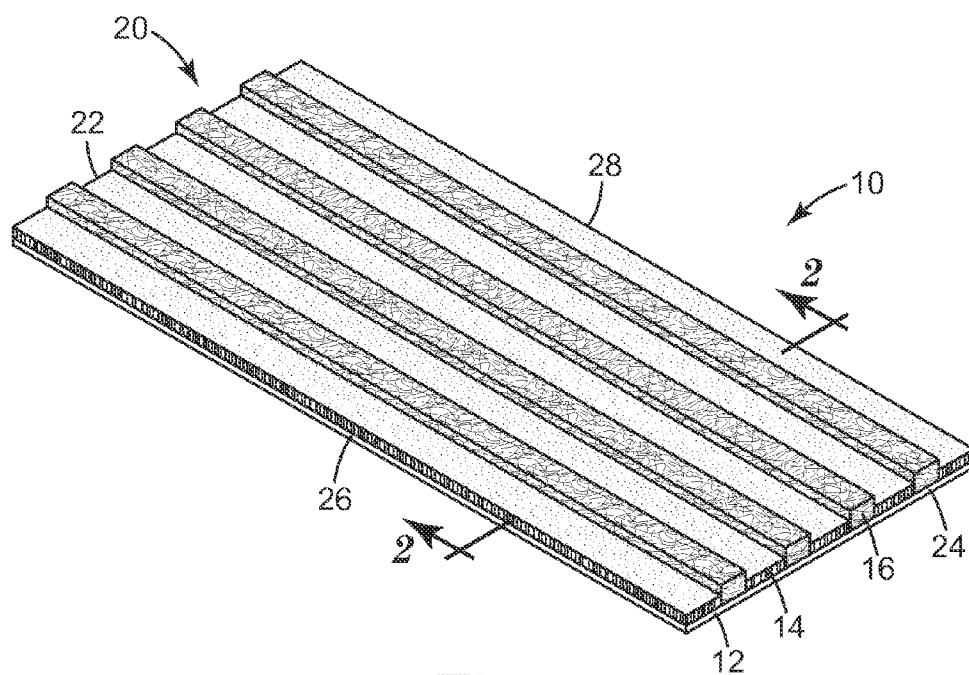


Fig. 1

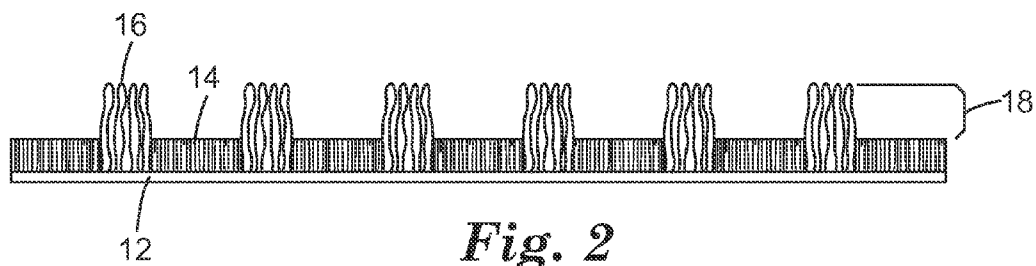


Fig. 2

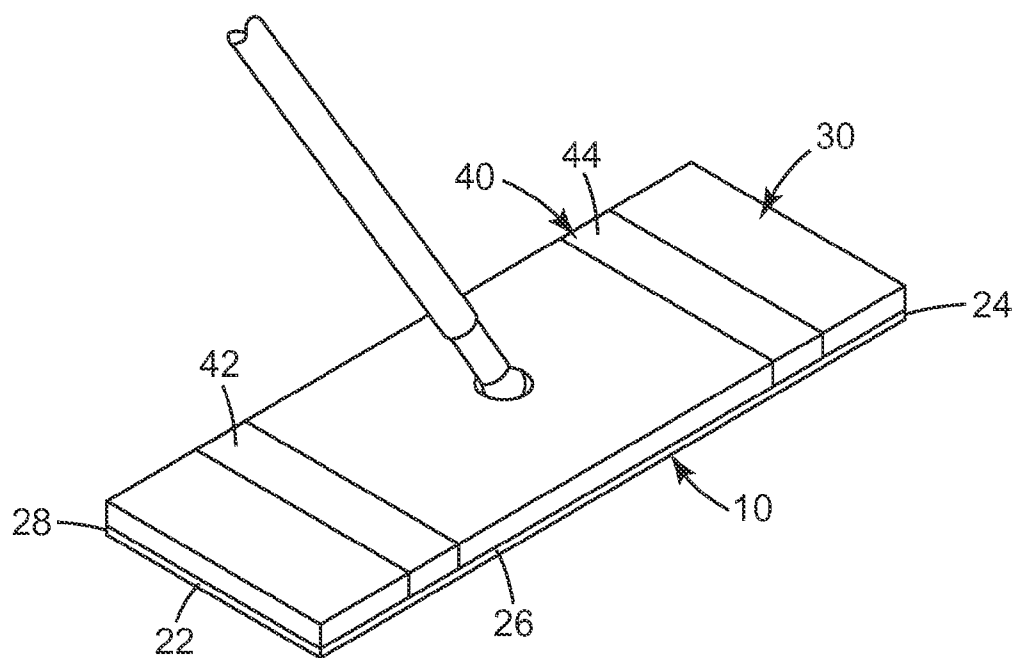


Fig. 3

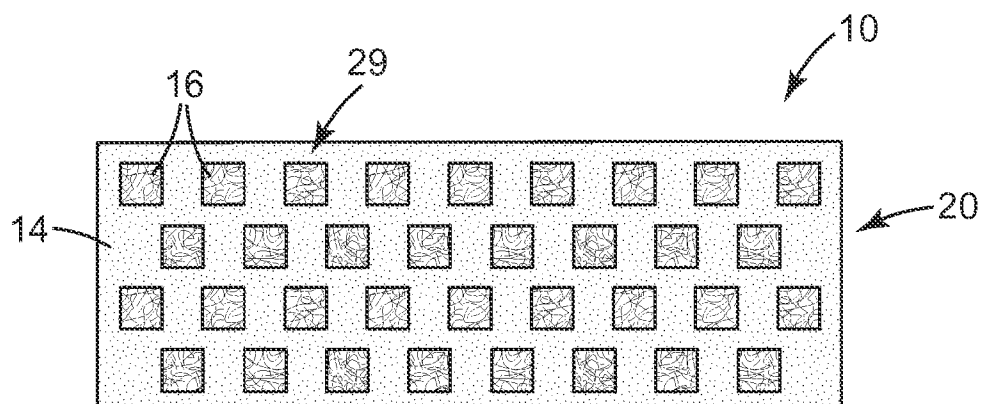


Fig. 4

CLEANING TOOL

BACKGROUND

[0001] The present disclosure relates to a cleaning cloth. In particular, the present disclosure relates to a cleaning cloth having cut pile and looped pile that is longer than the cut pile.

[0002] Disposable and reusable cloths are used for cleaning surfaces. Typically, disposable cloths are constructed of a nonwoven material that comprises a plurality of continuous or cut fibers secured together in a generally random arrangement. Reusable cloths are typically woven or knitted. Woven or knitted cloths for cleaning surfaces often include multiple types of fibers or yarns each with different size, denier, thickness, height, stiffness or the like to form a cleaning cloth with multiple cleaning functions. Using more than one kind of fiber in a woven or knitted cloth add complexity and therefore cost in the manufacturing process. However, it is desirable to have a single cleaning cloth with multiple cleaning functions.

SUMMARY

[0003] Disclosed is a cleaning cloth that is constructed from a yarn but has multiple cleaning functions. The cleaning cloth comprises base material, a looped pile formed of a yarn extending from the base material a first distance at a working surface, and a cut pile formed of the yarn extending from the base material a second distance at the working surface. The first distance is greater than the second distance by at least 0.5 mm. The longer looped pile is able to perform a sweeping action, while the shorter cut pile is a more dense arrangement of the fiber to capture and retain fine dust and debris. The disclosed cleaning cloth is therefore highly suitable for cleaning highly textured surface, such as tile floors.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] FIG. 1 is a perspective view of one embodiment of a cleaning cloth;

[0005] FIG. 2 is a side view of the cleaning cloth of FIG. 1;

[0006] FIG. 3 is a perspective view of the cleaning cloth of FIG. 1 attached to a mop;

[0007] FIG. 4 is a perspective view of another embodiment of a cleaning cloth.

[0008] While the above-identified drawings and figures set forth embodiments of the invention, other embodiments are also contemplated, as noted in the discussion. In all cases, this disclosure presents the invention by way of representation and not limitation. It should be understood that numerous other modifications and embodiments can be devised by those skilled in the art, which fall within the scope and spirit of this invention. The figures may not be drawn to scale.

DETAILED DESCRIPTION

[0009] FIG. 1 is a perspective view of one embodiment of a cleaning cloth 10 and FIG. 2 is a side view of the cleaning cloth 10 of FIG. 1. The cleaning cloth 10 comprises a base fabric 12 and extending from the base fabric is a cut pile 14 and a looped pile 16. The looped pile 16 extends from the base fabric 12 more than the cut pile 14 to form a height difference 18. The height difference 18 between the looped pile 16 and the cut pile 14 is best seen in FIG. 2.

[0010] In one embodiment, the loop pile 16 extends from the base fabric 12 at least 0.5 mm more than the cut pile 14. In another embodiment, the loop pile 16 extends from the base fabric 12 at least 1.5 mm more than the cut pile 14. In one

embodiment, the loop pile 16 extends from the base fabric 12 approximately 2 mm more than the cut pile 14.

[0011] Base fabric 12 is either woven or knitted. The base fabric 12 may comprise natural, synthetic or a combination of natural and synthetic fibers or microfibers. The base fabric 12 may be absorbent. The base fabric may be made from polyester, nylon, polypropylene, polyethylene, polyurethane, polyamide, cotton, rayon, wool, or combinations thereof. For example, one combination of fibers for the base fabric comprises a polyester and nylon blend.

[0012] The same yarn is used to make the cut pile 14 and the looped pile 16. Use of the same composition of yarn across the cleaning cloth surface 10 greatly simplifies the manufacturing of the cleaning cloth 10 resulting in cost savings. The yarn may be a single fiber or may comprise a plurality of fibers wherein the plurality of fibers may be of different composition or uniform composition. The yarn used for the cut pile 14 and the looped pile may comprise natural, synthetic or a combination of natural and synthetic fibers or microfibers. The yarn may be absorbent. The yarn may be made from polyester, nylon, polypropylene, polyethylene, polyurethane, polyamide, cotton, rayon, wool, or combinations thereof. For example, one combination of fiber includes a polyester, nylon, polypropylene blend.

[0013] The cleaning cloth may be fabricated using any well-known techniques for fabric construction, including knitting, weaving, tufting to achieve the loop formation and the cut pile and also to achieve the difference in height.

[0014] The cut pile 14 and the looped pile 16 extend from the base fabric 12 at the working surface 20. The working surface 20 is the surface that comes into contact with the surface to be cleaned. Therefore, the cut pile 14 and the looped pile 16 are in contact with the surface to be cleaned.

[0015] In the embodiment shown in the Figures, the working surface 20 is rectangular with a first edge 22, second edge 24, leading edge 26, and trailing edge 28. Leading edge 26 and trailing edge 28 are not intended to be limiting of any one particular direction. In this embodiment, the working surface 20 includes the cut pile 14 in rows extending from the first edge 22 to the second edge 24, and the looped pile 16, separate from the cut pile 14, in rows extending from the first edge 22 to the second edge 24. Therefore, as the working surface 20 is moved with the leading edge 26 first, a row of the longer extending looped pile 16 extends entirely across the working surface 20. Therefore, large particles of dirt or other debris will be more effectively captured and there will not be any significant gaps in the working surface 20 to allow material to pass through.

[0016] A variety of other sizes, shapes and configurations of the working surface 20 can be included. For example, the overall shape of the working surface 20 can be rectangular, square, triangular, oval, circular, or any number of various shapes. Generally, within the working surface the cut pile is on one portion of the working surface and the looped pile is on another portion of the working surface. A variety of arrangements of the separated portions of the cut pile and looped pile can be made. Within the working surface 20 the arrangement of the cut pile 14 and looped pile 16 can be in rows, similar to that shown in FIG. 1. The rows can be of uniform size and shape or can be different sizes or shapes from one another. For example, the row of cut pile could be narrower than the row of looped pile. The rows can be linear or can be zig-zag rows, sinusoidal rows, or other arrangements of rows. The cut pile and looped pile may be in a checker board arrangement. In

another arrangement, the cut pile comprises an island within the looped pile or the looped pile comprises an island within the cut pile. FIG. 4 shows an embodiment of a cleaning cloth 10 with a working surface 20 containing islands 29. In this embodiment, the islands 29 are square, but the islands could be any size or shape including circular, oval, rectangular, triangular, or other shape. In FIG. 4, the looped pile 16 comprises an island 29 with the cut pile 14 surrounding the island 29 of looped pile 16. When a working surface includes islands, it is preferable to include the island in one row to be offset from the islands in another row such that from a leading edge to a trailing edge, the longer looped pile 16 provides a continuous block to prevent larger dirt and debris from passing through from the leading edge to the trailing edge.

[0017] Any variety of areas of the looped pile 16 and cut pile 14 may be included. In one embodiment, at least 25 percent of the working surface 20 comprises looped pile 16. In another embodiment, at least 25 percent of the working surface 20 comprises cut pile 14. In another embodiment, at least 40 percent of the working surface 20 comprises cut pile 14 and at least 40 percent of the working surface 20 comprises looped pile 16. In the embodiment shown in FIG. 1, approximately 50 percent of the working surface 20 is cut pile 14 and 50 percent of the working surface 20 is looped pile 16. In the embodiment shown in FIG. 4, approximately 60 percent of the working surface 20 is cut pile 14 and approximately 40 percent of the working surface 20 is looped pile 16.

[0018] The yarn used to make the looped pile 16 and cut pile 14 is the same yarn. This results in efficiency of processing during manufacturing. Typically, in order to achieve multiple functions on a single cloth various materials are used. For example, yarns of different stiffness, thickness, absorbency will be used to give a cleaning cloth. Here one yarn is used in construction, but that yarn will for the looped pile 16 and a cut pile 14. The looped pile 16 is longer and the looped pile 16 remains connected, or looped, at its end. Therefore, two upward extending yarns of a single loop will function together as a single, connected yarn. The looped pile 16 being longer and connected will therefore be softer and more flexible. The looped pile provides a sweeping function that is able to conform in to highly textured surfaces like within grout lines of a tile floor.

[0019] The cut pile 14 the yarn is cut leaving independent, disconnected upward extending yarns. The ends of the cut pile 14 tend to fray due to the cutting. The cut pile 14 is shorter than the looped pile 16, and the frayed ends tend to cause the cut pile 14 to be more densely arranged than the looped pile 16. Therefore, the cut pile 14 is stiffer and thicker than the looped pile 16. The cut pile 14 provides a dust collecting function by trapping dust and debris within the dense cut fibers.

[0020] The cleaning cloth 10 is used to clean surfaces. Because of the arrangement of the longer, more flexible looped pile 16 and the shorter, more densely arranged cut pile 14, the cleaning cloth 10 is highly suited for dry dusting of textured surfaces. The cleaning cloth 10 can be use used with or without a cleaning implement.

[0021] FIG. 3 is a perspective view of the cleaning cloth 10 of FIG. 1 attached to a mop 30. Typically the cleaning cloth 10 will include an attachment mechanism 40 for securing the cleaning cloth 10 to the mop 30. As shown in FIG. 3, the cleaning cloth 20 includes two elastic bands 42, 44 for stretching over the mop and securing the cleaning cloth 20. Other attachment mechanisms 40 can be used including any

variety of mechanical attachments such as pinch points on the mop, mechanical fasteners on the mop, hook/loop or hook/hook attachment between the mop and the cloth, or adhesive attachment. The cleaning cloth 10 may include pockets or sleeves for sliding over the mop 30.

[0022] The cleaning cloth 10 attached to the mop 30 is used to dry-dust a textured floor. One example of a textured floor is a tile surface with grout lines. The looped pile extends into the grout lines and sweep out the dirt and debris, and the cut pile 14 being shorter and more densely arranged can capture and retain the dirt and debris.

[0023] Although specific embodiments of this invention have been shown and described herein, it is understood that these embodiments are merely illustrative of the many possible specific arrangements that can be devised in application of the principles of the invention. Numerous and varied other arrangements can be devised in accordance with these principles by those of ordinary skill in the art without departing from the spirit and scope of the invention. Thus, the scope of the present invention should not be limited to the structures described in this application, but only by the structures described by the language of the claims and the equivalents of those structures.

EXAMPLES

Mop Performance Test

Materials Needed:

[0024] Vacuum cleaner

Wet floor mop, such as a conventional sponge mop or a strip mop

Liquid floor cleaner, such as 3M™ Neutral Cleaner, available from 3M Company.

Dry floor mop, such as the SCOTCH-BRITE™ M-005 Hardwood Floor Mop, available from 3M Company.

Cleaning head to be tested

White Lint Tape, such as that found on a Scotch™ Lint Roller, available from 3M Company.

Tile floor section comprised of 6"×6" grouted ceramic tiles

Dirt (topsoil ground and sieved to the range of 1.006 to 0.014 inches)

Procedure:

[0025] The tile floor was cleaned by first vacuuming the floor followed by washing the floor by spraying 3M™ Neutral Cleaner onto the floor and wiping it up with the SCOTCH-BRITE™ M-005 Hardwood Floor Mop. The floor was then allowed to dry. After the floor was dry, 3.0 grams of topsoil dirt was uniformly spread on a 12"×12" section of the floor. The cleaning head to be tested was placed on the dry floor mop and then the cleaning head was positioned on the floor in front of the dirt section to be cleaned. One pass was made with the cleaning head by pushing the cleaning head across the floor and past the dirt section.

[0026] A sheet of white lint tape was then placed on the cleaned section of the floor, with the adhesive side down. The back of the tape was then carefully rubbed by hand to pick up any dirt left behind on the tile and in the grout. The adhesive side of the lint tape was then visually observed to evaluate how much dirt that was left behind on the floor was picked up by the lint tape adhesive.

[0027] A ranking system of between 0 and 5 was used to rank how well the cleaning head removed the dirt from the floor. A score of 0 is essentially equivalent to a clean tile floor,

indicating that no dirt was picked up by the lint tape (i.e., essentially all of the dirt was removed by the cleaning head and no dirt remained on the tile or in the grout lines). A score of 3 indicates that approximately half of the dirt was picked up by the lint tape (i.e., about half of the dirt was removed by the cleaning head and about half of the dirt remained on the tile or in the grout lines). A score of 5 is essentially equivalent to the dirt covered floor before cleaning, indicating that all of the dirt was picked up by the tape (essentially none of the dirt was removed by the cleaning head).

Example E1 and Comparative Examples C1-C4

[0028] The above-described mop performance test was carried out using four different cleaning heads and a bristle broom. Three samples per cleaning head were tested. The cleaning heads that were tested were as follows:

Example E1: a rectangular mop head similar to that shown in FIGS. 1 and 2. The base fabric of this microfiber cloth was 85% polyester and 15% nylon. The working surface of this microfiber cloth included alternating rows of cut and looped pile. Each row of looped pile was approximately 11 mm wide and the each row of cut pile was approximately 11 mm wide. The overall working surface was approximately 410 mm long and 135 mm. The looped pile was approximately 2 mm higher than the cut pile. The microfiber composition was the same for both the cut and looped pile areas of the cloth and was made up of 80% polyester fibers, 10% nylon fibers, and 10% polypropylene fibers. The size of the individual filaments making up the fibers was less than 1 denier.

Comparative Example C1: a SCOTCH-BRITE™ Microfiber Hardwood Floor Mop cloth available from 3M Company, St. Paul, Minn.

Comparative Example C2: a SCOTCH-BRITE™ Microfiber Super Duster cloth, available from 3M Company, St. Paul, Minn.

Comparative Example C3: a SWIFFER™ Sweeper dry sweeping cloth, available from Procter & Gamble, Cincinnati, Ohio.

Comparative Example C4: a conventional long handled synthetic bristle broom.

The results of the tile mop performance test are shown below in Table 1.

TABLE 1

Example	Mop Performance Test Ranking
E1	0.5
C1	2
C2	2
C3	3.5
C4	4.5

What is claimed is:

1. A cleaning cloth comprising:

base material;

a looped pile formed of a yarn extending from the base material a first distance at a working surface;

a cut pile formed of the yarn extending from the base material a second distance at the working surface; wherein the first distance is greater than the second distance by at least 0.5 mm.

2. The cleaning cloth of claim 1, wherein the first distance is greater than the second distance by at least 1.5 mm.

3. The cleaning cloth of claim 1, wherein the working surface comprises at least 25% loop pile.

4. The cleaning cloth of claim 1, wherein the working surface comprises at least 25% cut pile.

5. The cleaning cloth of claim 1, wherein the working surface comprises at least 40% cut pile and at least 40% loop pile.

6. The cleaning cloth of claim 1, wherein the working surface comprises a plurality of rows of the looped pile and a plurality of rows of the cut pile.

7. The cleaning cloth of claim 1, wherein the cleaning cloth is attached to a cleaning implement for cleaning a textured surface.

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