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E. C. BLOCH ET AL
LOOP PILE CARPET FABRIC
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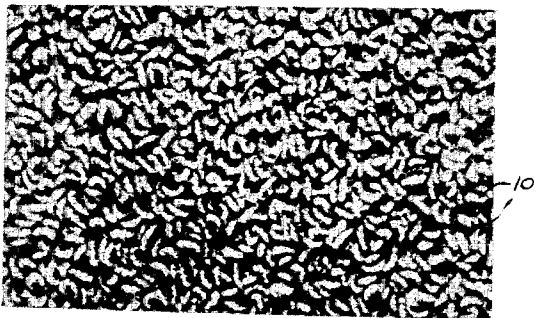


Fig. 1

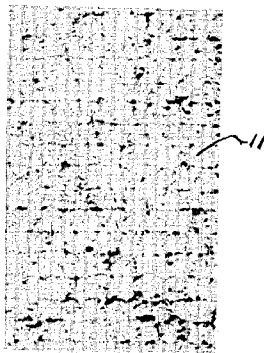


Fig. 2

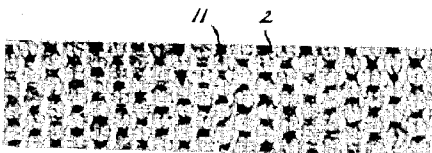


Fig. 3

Fig. 4

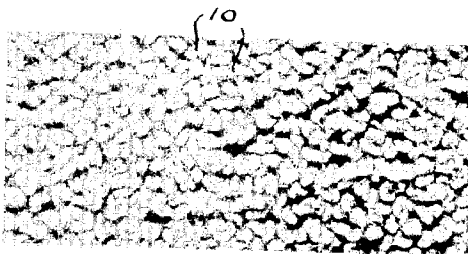
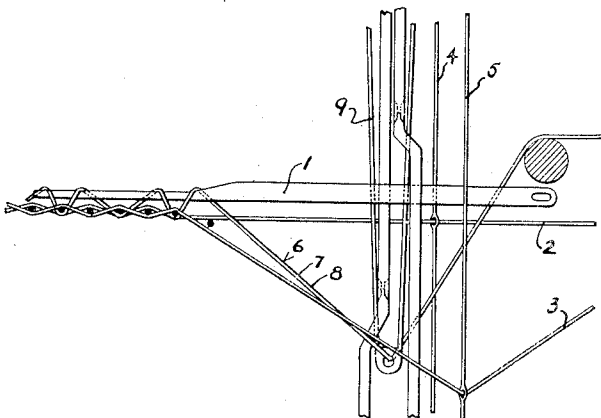


Fig. 5

INVENTOR
ELSIE C. BLOCH
GODFREY BLOCH
BY *David M. Hoar*
ATTORNEY

UNITED STATES PATENT OFFICE

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LOOP PILE CARPET FABRIC

Elsie C. Bloch and Godfrey Bloch, New York, N. Y.

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4 Claims. (Cl. 28-74)

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The present invention relates to improvements in loop pile carpet fabrics, and relates more particularly to curled looped pile carpet of relatively fine yarns, that is, yarns approximately 40 yards per ounce and finer.

One object of the invention is the provision of a pile carpet in which a greater curl and coverage is produced with hard-twisted yarns, and which permits invisible joining without necessarily maintaining direction.

Another object of the invention is the provision of a method of making a looped pile carpet by leno weaving, in which critical elements are combined to make a novel carpet economically.

Still another object of the present invention is the provision of a looped pile carpet of the woven type which is characterized by a well-covered surface of curly loops showing the same color when viewed from all directions, free from visual lines usually found in carpets, in which tufts and fibers are bound in at short intervals, the same being made of hard-twisted pile yarns having substantial wool content.

At this time, curled loop carpets are offered of very coarse yarn structures, or rovings, not comparable in appearance with the present product. The present invention provides for the use of fine yarns in low pile carpet.

It has been found that the several elements later set forth combine to produce a novel and unique result in a curled loop pile carpet of pleasing distinctive appearance, covered by fine curled loops, substantially free of lines or direction, and in which the fibers are tied in, withstand cleaning by brushing action and can be produced at a reasonable cost. The use of high pile in fine yarns produces a shaggy effect which does not clean well when brushing equipment is used. It also uses a greater amount of wool and cannot therefore be sold as reasonably.

The objects of this invention are obtained by the use of a construction the limits of which may differ with certain variations, but which may generally be defined as follows:

In practice, it has been found that the best results are obtained from a gauge $\frac{4}{16}$ ", using highly twisted yarns high in Indian wool content. When the gauge or wire height used is below $\frac{3}{16}$ " the fabric assumes warp lines and directional appearance unless quite fine yarns are used, and when a gauge much above $\frac{5}{16}$ " is used, a greater quantity of yarn is necessary and the resultant carpet becomes shaggy and less resistant to the action of mechanical brushing, the fibers being less frequently locked into the back.

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It has further been found that to secure the present results it is preferable to use highly twisted plied yarns 50 to 60 yards to the ounce. It is preferred to use yarns made of carpet wools, but other yarns, including synthetics, or combinations of wool and synthetic yarns may be used. Yarns much finer than 60's may involve greater expense of spinning, while yarns coarser than 40's will involve the use of too great a poundage of wool in order to obtain an adequate number of threads to cover.

By highly twisted yarns, preferably plied, is meant yarn with sufficient twist to cause the loops to curl or crinkle after weaving, especially when subjected to the subsequent heat and moisture action. In the preferred size of 50 yards to the ounce, such twist should be 8-9 turns to the inch. The thread count preferred is 12 or $12\frac{1}{2}$ pile threads per inch in the warp to secure the best results.

In practice of this invention, a number of variations from the more conventional carpet manufacture are resorted to and contributes to the final obtaining of marked curling, good coverage and distinctive texture. These are listed as:

1. The use of two (or more) warp ends weaving as one to make each loop, thereby cutting in one-half (or reducing) the number of rows of loops for a given number of pile threads per inch.

2. The use of leno or doup heddles in weaving.

3. The employment of moisture and heat after weaving.

4. And as a special variation, piece-dyeing.

It has been found in the preferred embodiment of this invention that the weaving of loops from two (or more) pile threads acting as one for the purpose, that is the use of, say, $12\frac{1}{2}$ pile threads per inch, that is to the square inch there are approximately 50 to 75 loops, preferably about 62, as in the fabric shown in Fig. 1, gives only six plus rows of pile threads per inch. This method leaves space between the rows of loops sufficient for the loop threads to curl, especially when moisture and heat are applied, as will later appear. This gives coverage of itself, and also it makes convenient the use of leno or doup heddles, wherein gauges would become crowded within our range of threads per inch if each warp pile thread were woven separately. It is intended to convey two (or more) warp threads weaving as one, when these two threads are drawn over the same gauge together, even if an extra ground end is drawn between them, or if in ordinary round wire or other weaving, they are

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acted upon together to form substantially one loop.

In order that the invention may be more fully understood and its advantages fully appreciated, attention is invited to the accompanying drawings, in which:

Figure 1 is a face view of a piece of this looped carpet achieved after heat and moisture treatment.

Figure 2 is a rear face view thereof with a chemical backing.

Figure 3 is a rear face view of the fabric as it comes from the loom.

Figure 4 is a face view of this carpet showing pebble or bouclé effect achieved after dyeing.

Figure 5 is a detailed side view of certain loom elements and yarns constituting part of the draft through a dent of a loom reed, showing one mechanical arrangement by which this loop carpet can be woven.

Referring to the drawings, the numeral 1 designates a gauge, 2 and 3, the ground warp yarns threaded through heddles 4 and 5 respectively, when the carpet is made upon a leno weaver.

The loop-forming or supply element 6 is composed of two strands 7 and 8 of yarn, threaded through the eye of a doup 9, so that in this arrangement, the weaving of two fine ends (or more) as one forms a well-covered effect in the finished looped carpet.

As before stated, it has been found that a gauge of $\frac{1}{16}$ " is preferred, but this may be varied to from $\frac{1}{16}$ " to $\frac{3}{16}$ ". It has also been found preferable to use two-ply 50—55 yards to the ounce wool yarn for the loops 10, because, as above stated, with much finer yarns the cost of spinning is too great, so that yarns from 45 to 55 yards to the ounce have been found more desirable, resulting in a better and more economical looped pile carpet.

Again, also, the thread count is critical, that is, it has been found that such count should approximate in the woven carpet $12\frac{1}{2}$ threads to the inch or to the square inch there are approximately 50 to 75 loops.

Thus by using these practical sized gauges, two or more pile threads weaving as one, there is produced an unexpected and new result in this looped pile carpet; and which when made by leno weaving, in which the yarns are thrown to the right and to the left, the desired effect is accentuated. The above critical steps not only provide the desired coverage, but give better crinkle, while to produce random coverage the yarns 7 and 8 may be twisted right and left respectively, and may each be of a different selected color, and one may be twisted and one untwisted, or they may be of different sizes.

A back coating 11 is painted or otherwise applied on the back of the carpet to hold effectively and permanently the loops firmly in place, and as this backing material is preferably of a natural or synthetic latex base, it prevents the carpet from shrinking greater than 3% when piece-dyed, whereas normally carpet will shrink up to 8%. Also by holding the bases of the loops anchored against creeping during the dyeing process, the loops curl up more tightly and thus give to the face of the carpet a pebbly or bouclé appearance, in which some of the loops assume a position much lower or closer to the ground than others.

Therefore by the present method of weaving and the use of the proper gauges and yarns, a new category of looped pile carpet results.

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It has been found that the best results are obtained by subjecting the pile yarn to moisture treatment and subsequent drying. Heat and moisture treatment is combined with the drying of the backing, which is applied in order to hold the loops firmly in place. The backing 11 may be of any suitable compound such as is commonly used for this purpose, and it may be of latex of any kind, such as synthetic or natural rubber, plastic such as vinyl, or pyroxylin compounds, synthetic rubber such as neoprene being preferred. In practice the drying and curing of the backing material contributes sufficient moisture treatment to produce the curling, but treatment with steam separately or otherwise can be used.

Although the drawings show this looped pile carpet fabric as being produced by leno weaving, it is possible to produce similar effects by usual methods of manufacture.

From the foregoing description taken in connection with the drawings, it is evident that there is here produced a looped pile carpet fabric of the woven type which is characterized by a well-covered surface of curly loops showing the same color when viewed from all directions, free from visual lines usually found in carpets, in which fibers and tufts are bound at short intervals, the same being made of hard-twisted pile yarns preferably having substantial wool content, and in which the loop heights are extended from the ground fabric thread to a desired height to give the above results and the loops are arranged 50 to 75 loops per square inch, the ground warp and filling forming a ground fabric with adhesive means to effectively and permanently hold the pile additionally to that of the jute and cotton of the ground threads.

It is understood that variations may be made in the above procedure without departing from the invention, so long as enough of the specification is adhered to to produce the desired result, which is unique and new, and which is distinguishable from other carpet fabrics manufactured in the eyes of persons skilled in this art.

By the combination of the above elements, a fabric is produced not only pleasing and novel in itself, but one which may be dyed to produce yet another different and novel product. When fabric made by the above specification is piece-dyed the pile loops curl differentially forming a high and low pebbly or bouclé effect not heretofore produced by any method of manufacture. Furthermore, with proper stable latex backing the shrinkage of the carpet may be controlled to approximately 3% in dyeing, whereas in conventional carpets the shrinkage is about 8%.

To achieve a lustrous glint or sparkle in this fabric we may use in addition to or replacing one of the wool ends, a more lustrous yarn which may be of synthetic material such as nylon or rayon (if rayon, preferably of high tenacity), or it may be of more lustrous wool, such as South American, to contrast with another yarn which will be of less lustrous material, such as an Indian or Chinese blend. The plied yarns may consist of one ply more lustrous than the other and they may consist of blends identical with or varying from each other.

Where "anchoring element" or "anchoring material" is used, they refer to a coating material, and added sheet of fabric, and/or a sponge rubber backing.

By the term "yarns," or "fine yarns" we mean yarns from 22 yards to the ounce and up, spe-

cifically excluding rovings or very much coarser yarn structures.

By the term "hard twist" we include plied yarns hard-twisted together, even though they may contain elements not hard-twisted in their original state.

Where it is claimed that fibers or loops are tied in at short intervals, it is meant that they are tied in at their bases, and the loop heights within the limits specified determine the frequency of the tying in, i. e., the shorter the loop in height, the shorter the interval.

By "different characteristics" in the claims is meant the difference in amount or direction of twist, difference between lustrous and dull, synthetic and wool, difference in color, as disclosed in the specification.

The contortion or curling of the loops under treatment refer to such contortion as takes place additionally to that which existed before the heat and moisture treatment. The words of "of substantial wool content" are meant to designate compositions of 50% or more of wool.

Having thus described the invention, what is claimed is:

1. A woven looped pile carpet fabric consisting of a warp and filling forming a ground, and loops formed from hard twisted pile yarns 30 to 60 yards per ounce, of loop height when extended $\frac{1}{4}$ to $\frac{1}{2}$ inch from the ground fabric to under the pile thread, and a backing material from which the pile loops above the ground are substantially free, which constitutes an adhesive for the loops and fibers of the loops, thereby producing a carpet fabric characterized by freedom from visual imperfections usually found in carpets, free from pile crushing, capable of substantially invisible joining and true to color regardless of

the direction from which it is viewed, with the fibers and loops held in at close intervals for high resistance to wear.

2. A carpet fabric according to claim 1, in which the loops are formed in pairs.

3. A carpet fabric according to claim 1, in which the loops are formed in pairs and in which the two loops of each pair are of contrasting colors.

4. A carpet fabric according to claim 1, in which the loops are formed in pairs and in which the two loops of each pair are of different materials.

ELSIE C. BLOCH.
GODFREY BLOCH.

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