May 21, 1929. W. PEARSALL 1,714,104

PILE FABRIC

Filed May 25, 1928

Fig. 1

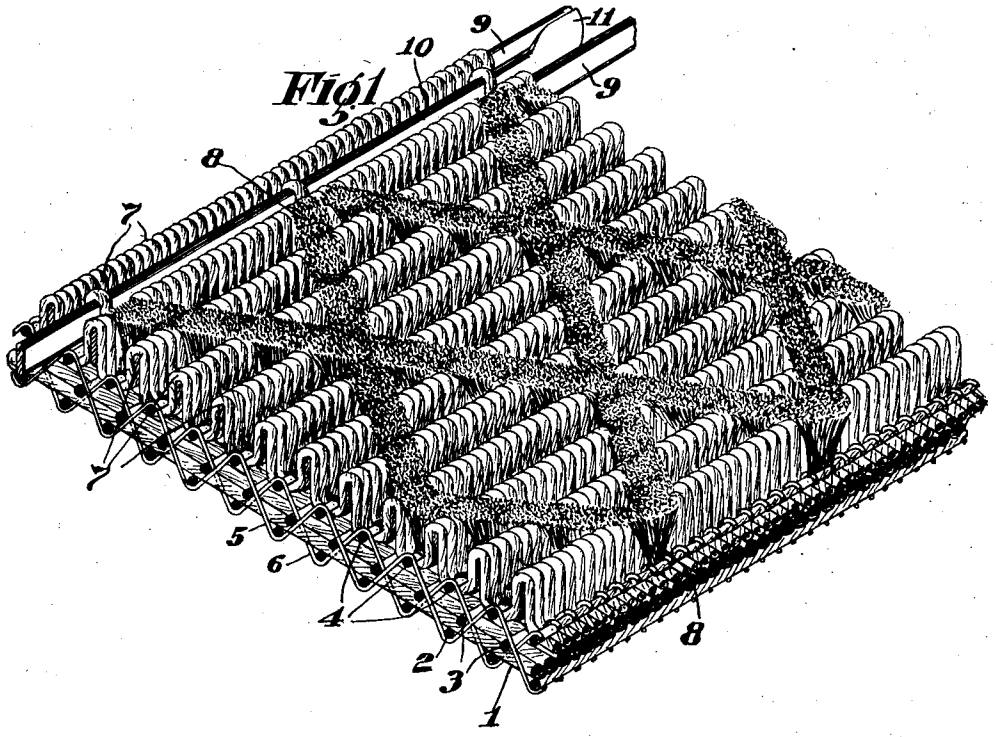


Fig. 2

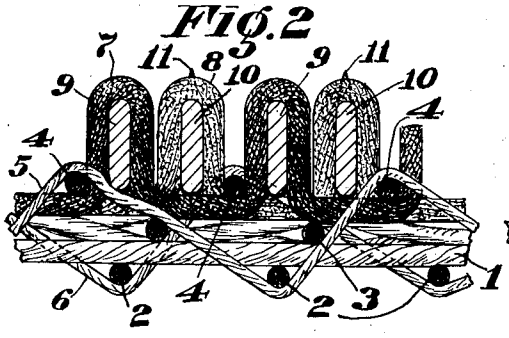


Fig. 3

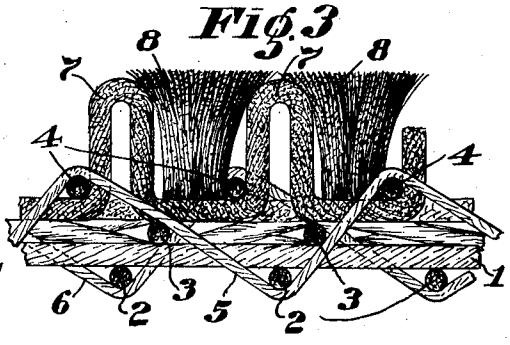
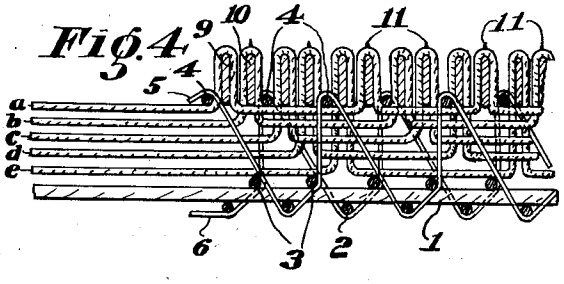


Fig. 4



INVENTOR:
William Pearsall
BY Bob O. Harris,
ATTORNEY

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UNITED STATES PATENT OFFICE.

WILLIAM PEARSALL, OF THOMPSONVILLE, CONNECTICUT, ASSIGNOR TO BIGELOW-HARTFORD CARPET COMPANY, OF THOMPSONVILLE, CONNECTICUT, A CORPORATION OF MASSACHUSETTS.

PILE FABRIC.

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This invention relates to woven fabrics, and is more particularly directed to pile fabrics in which the pile surface is formed by pile loops in adjoining rows bound to the backing between the same binders and wherein enhanced figuring effect may be obtained by cut and uncut loops.

It has heretofore been proposed to provide pile fabrics with a cut and uncut pile surface in an attempt to produce a figure effect, and to this end it has been the practice to weave successive rows of cut and uncut pile loops each extending the full width of the cloth and bind each row to the backing by its own separate binders with the result that each row of loops, whether cut or uncut, presented a defined separation of one row from the adjoining row and consequent limitation of possible figuring effect. Two distinct rows of loops—that is, a cut row and an uncut row—were thus required for each transverse line of the figure or pattern where such rows were formed over cutting and uncutting pile wires and the pattern or figure was not well defined.

In the production of pile fabrics having cut and uncut pile it has also been proposed to cut off the tops of some of the loops in a row, thus necessitating that the cut loops be of less height than the loops remaining uncut. It has been proposed further to form all the pile with uncut loops, then depress some of the loops and cut those not depressed, but in each case the pattern or figure formed by the cut and uncut loops was not well defined and especially along the borders or outline of the pattern or figure.

The object of the present invention is to provide a pile fabric with pile loops, wherein the pattern or figuring effect is sharp and well defined and is susceptible of great and practically unlimited variation during the weaving operation. In accordance with the present invention, the backing fabric may be of any suitable character produced by warp and weft threads, and the pile surface is formed by pile loops, the adjoining lashes or rows of which transversely of the fabric are bound to the backing between the same face or binder weft threads so that the two adjoining lashes or rows of pile loops, when beaten to place, present the appearance of being formed as a single row. In carrying this feature of the invention into effect the adjoining lashes or rows of loops are formed over pile wires and each lash or row may comprise any desired number of warp threads in accordance with the pattern to be produced.

In some cases, as required by the pattern, one of the pile wires may be equipped with a knife to cut the pile loops of one of the lashes or rows of loops as the wire is withdrawn, while the wire for the companion or adjoining lash or loops may be plain, to leave its loops uncut, and both the cut and uncut pile in adjoining lashes will be bound to the backing between the same pair of binder weft threads, the effect being that the cut and uncut loops of the adjoining lashes present the appearance of being in the same transverse row of pile in the finished product.

By variation in the number of warp threads in each lash or row of loops it is evident that great variation in the pattern effect may be produced even by the use of a single color warp, because of the contrasting effect of the cut and uncut pile loops, apparently in the same transverse row between the same pair of binder weft threads, and by variation in the color of the warp and formation of each lash by jacquard or other shed forming mechanism, the figuring effect may be changed almost idefinitely, and similarly by the use of like pile wires alternating with groups of other pile wires the pattern effect and contrasting appearance of the cut and uncut pile loops may be further enhanced.

The invention in one of its simple forms is shown in the accompanying drawings and will be hereinafter described with the understanding, however, that great variation in pattern effects may be made by any or all of the expedients hereinbefore mentioned.

In the drawings:

Fig. 1 is a perspective view of a piece of fabric containing the present invention in its simple form, showing the use of a cutting and non-cutting pile wire in adjoining lashes or rows of pile loops between the same binder weft thread, and one of the pattern effects that may be produced thereby;

Fig. 2 is a longitudinal section of the fabric showing the pile loops of adjoining lashes or rows as they appear over the cutting and non-cutting pile wires and bound to the backing between the same surface binder or weft threads;

Fig. 3 is a similar view showing the pile wires as having been withdrawn and the cut

and uncut pile loops in adjoining lashes or rows bound in place between the same binder weft threads; and

Fig. 4 is a diagrammatic view in longitudinal section showing the use of different kinds or colors of pile forming warp threads and the cutting and non-cutting pile wires in place.

The backing fabric may be woven in any suitable manner calculated to furnish a proper support or back for the pile surface and, as shown in the present instance, it comprises stuffer warp threads 1, weft threads 2 and 3, pile binder weft threads 4, and the binder warp threads 5 and 6, and to the backing fabric the adjoining lashes or rows of pile loops, cut or uncut, are bound by and between the same pair of pile binder weft threads with the result that the two lashes or rows of pile are held in such close relation that they present the appearance of pile loops in a single transverse lash or row without separation or demarkation between the two adjoining rows.

In Figs. 1, 2 and 3 of the drawings, uncut pile loops of one of the adjoining lashes or rows are indicated at 7, while the cut pile loops of the companion or adjoining lash or row are indicated at 8, and both lashes or rows of pile loops are bound to the backing fabric by and between the same pile binder weft threads 4, 4, so that on the beat-up the two companion or adjoining pile loops are forced into such close relation that the two appear in a single row transversely of the fabric. The number of pile forming warp threads that are utilized in forming the adjoining lashes or rows may be varied indefinitely by the shedding mechanism or jacquard in accordance with the desired pattern. In the fabric shown by Fig. 1, all of the pile forming warp threads are of the same color, but the contrast between the cut and uncut loops presents a sharp and well defined pattern or figuring effect without breaks or interruptions that are frequently apparent in cut and uncut pile fabrics where each lash or row is separately bound to the backing fabric.

In the particular pattern represented by Fig. 1, the number of uncut pile loops in one lash or row is greater than the number of cut loops in the companion or adjoining lash or row, and by variation in the relative positions of the successive cut and uncut lashes or rows or loops a pattern effect such as shown or any variation thereof may be produced, even with pile forming warp threads of the same color or kind, without breaks or grinning through of the backing fabric.

The fabric of the present invention is produced by the use of cutting and non-cutting pile wires associated with any desired character of shedding mechanism which will form the adjoining lashes or rows of appropriate number of pile forming warp threads, and in the instance of the invention as shown by Fig. 1, the number of warp threads desired in the formation of the uncut loops 7 in any one lash or row to be associated with the cut lash or row adjoining, are passed over a plain or non-cutting pile wire 9, while the number of warp threads desired in the adjoining lash or row of cut loops 8 are passed over a pile cutting wire 10 having a cutting blade 11, and the two are bound to the backing fabric between the same pair of binder weft threads 4, 4, so that when the beat-up takes place and the wires are withdrawn, the cut and uncut pile loops are interlaced or so intimately bound together that a transverse row of pile between a pair of binder weft threads presents the appearance of cut and uncut pile loops in a single row.

While the invention as exemplified in Figs. 1, 2 and 3, shows the pile loops of adjoining rows composed of alternate cut and uncut pile loops bound to the backing as one between the same pair of binder weft threads, this particular arrangement may be varied in accordance with the desired pattern and the pile wires of either kind be grouped to produce special pattern effects, the essential being that adjoining lashes or rows of loops be found to the backing fabric as a unit between the same binder weft threads 4, 4 which are themselves bound to the backing fabric by the binder warp threads 5 and 6, substantially as shown.

Cut pile loops formed by the withdrawal of a pile cutting wire usually require trimming or shearing to produce a satisfactory pile surface, and to permit this to be done, where cut and uncut loops are associated for the production of pattern effects, the uncut pile loops are purposely formed sufficiently lower than the cut pile loops to admit the cut pile loops to be sheared without injury to the uncut pile loops which might spoil or mar the desired pattern effect.

As hereinbefore stated, great variation in pattern or figure effects is possible in accordance with the present invention by a single color or kind of pile forming warp threads, as exemplified in the above exploitation of the invention, but in further development of pattern effects the use of a jacquard, preferably with a double set of cards, permits great variation in desired figure, design, or coloring. This will be apparent at once to those skilled in the art without detail explanation, but in Fig. 4 an illustration is given, wherein the backing fabric, including the stuffer warp 1, the weft threads 2 and 3, the pile binder weft threads 4, 4, and the binder warp threads 5 and 6 may be substantially as described in connection with Figs. 1, 2 and 3. The pile forming warp threads *a*, *b*, *c*, *d* and *e*, however, are indicated as of different kinds or colors and are selectively raised by the jacquard in accordance with the desired pat-

tern or color effect for the insertion of the pile forming wires. For instance the pile warp *a* is shown raised over the pile wire 9 at the left in said Fig. 4 to form a series of pile loops transversely of the fabric, and on the next shed formation warp thread *a* is depressed and pile forming warp *b* is raised over pile wire 10 to form the adjoining lash or row of loops, and both are bound as one to the backing between the same binder weft threads 4, 4.

If the wire 9 is a non-cutting wire and the wire 10 a cutting wire the two adjoining lashes or rows will present cut and uncut pile loops which may be of different colors, or if both the pile wires are of the same kind then the pile loops, whether cut or uncut, will present different color designs, both, however, bound as one to the backing fabric between the same binder weft threads.

The pile warps *c* and *d* may be similarly manipulated, while the remaining pile warp threads may float within the body of the fabric.

The great variation in sharp and well-defined pattern, figure, and design, rendered possible by the present invention at once becomes apparent to one skilled in the art, and is especially advantageous in rugs, carpets, upholstery and like pile fabrics where changes in pattern effects are frequently required.

What is claimed is:

1. A woven fabric comprising a backing of warp and weft threads and having a pile surface formed in figuring effect by pile loops, the lashes of pile loops being arranged across the fabric in pairs of contacting transverse rows unseparated by a weft thread and bound to the backing between the same adjacent pairs of face binder weft threads.

2. A woven fabric having a backing of warp and weft threads and a pile surface formed in figuring effect by cut and uncut pile loops, the lashes of pile loops being arranged across the fabric in pairs of contacting transverse rows unseparated by a weft thread and bound to the backing between the same adjacent face or binder weft threads to present the appearance of cut and uncut pile loops in a transverse row of loops.

3. A woven fabric having a backing formed of warp and weft threads and a pile surface formed in figuring effect by uncut pile loops and higher cut pile loops, the lashes of pile loops being arranged across the fabric in pairs of contacting rows consisting of one cut row and one uncut row and unseparated by a weft thread, and both rows being bound to the back between the same pair of face or binder weft threads and presenting the appearance of both cut and uncut loops in each transverse row.

4. A woven fabric having a backing formed of warp and weft threads and a pile surface formed in figuring effect of different colors by cut and uncut pile loops, the lashes of pile loops being arranged across the fabric in pairs of contacting transverse rows unseparated by a weft thread and bound to the backing between the same face or binder weft threads to present the appearance of cut and uncut pile loops in a transverse row of loops.

5. A woven pile fabric comprising a woven backing fabric having weft threads secured at its face and back by binder warp threads, and having a pile surface formed in figuring effect by cut and uncut pile loops, the lashes of the pile loops being arranged across the fabric in pairs of contacting rows unseparated by a weft thread and bound to the backing fabric between the same adjacent pair of face weft threads.

In testimony whereof, I have signed my name to this specification.

WILLIAM PEARSALL.