July 29, 1941. H. H. BAYNTON 2,250,901

METHOD OF MAKING PILE FABRIC

Original Filed March 8, 1940 2 Sheets-Sheet 1

FIG. 1.

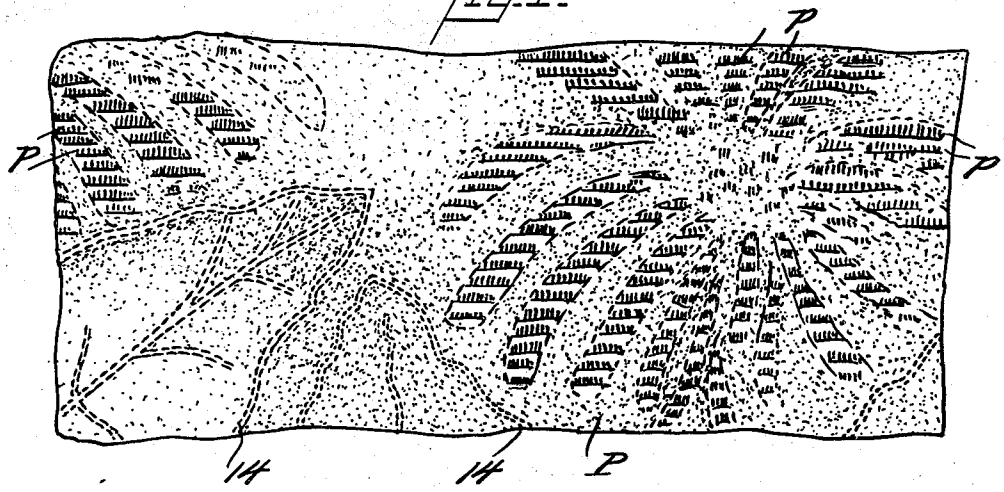
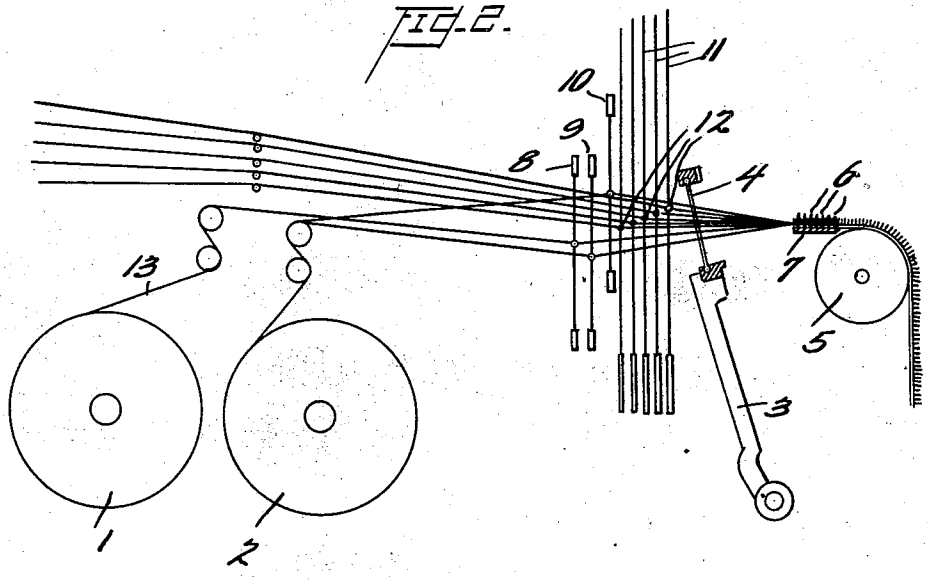


FIG. 2.



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Original Filed March 8, 1940 2 Sheets-Sheet 2

FIG. 3.
Prior Art

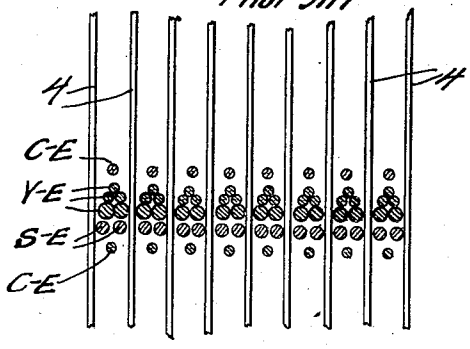


FIG. 4.

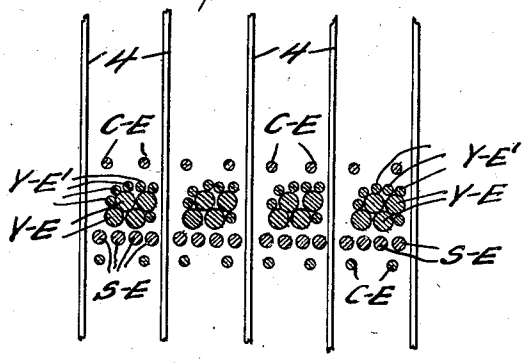


FIG. 5.
Prior-Art

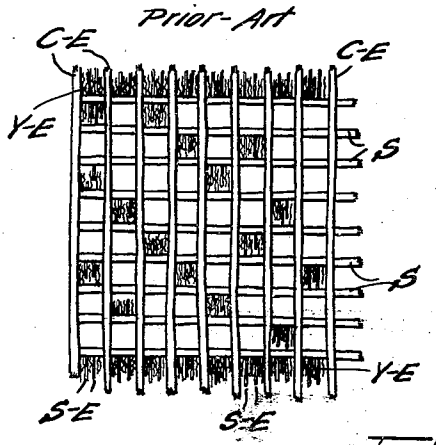


FIG. 6.

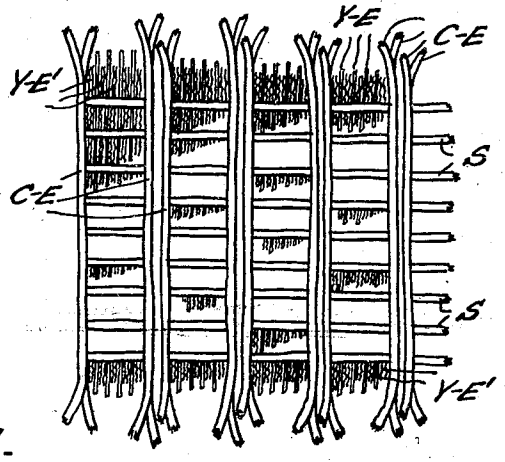
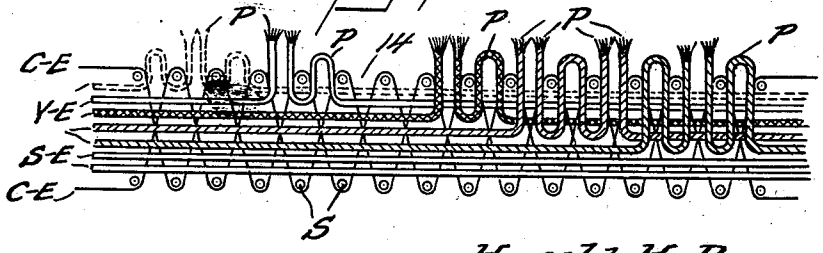


FIG. 7.



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METHOD OF MAKING PILE FABRIC

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Original application March 8, 1940, Serial No. 323,013. Divided and this application August 27, 1940, Serial No. 354,445

1 Claim. (Cl. 139—37)

My invention relates to new and useful improvements in the method of making pile fabrics, and the present application is a division of one filed by me on March 8, 1940, Serial Number 323,013, for Pile fabrics and the method of making the same.

An object of the invention is to provide a method for weaving a novel fabric which combines not only an embossed effect from the cut and uncut yarns but also includes what might be termed a carved effect, which imparts to the surface of the fabric a further faint but clearly distinguishable design or motif. This is obtained by having certain yarn ends woven in the back or base, so that there is no cut or uncut yarn in the design or motif but rather an absence of yarn, which makes the motif discernible from light refraction at different angles.

A further object of the invention is to provide a method for weaving a pile fabric wherein the principal motif or the most discernible motif would consist of the uncut yarns and the cut pile, which is the ordinary or conventional way to provide patterns or motifs in pile fabrics generally of one color; and to further combine what might be termed a secondary motif, which is apparent when viewed from different angles by the light refraction and which is caused by an absence of yarn or pile. However, the adjacent pile will fold or be compressed, so that this secondary motif becomes very faint but nevertheless apparent.

Still another object of the invention is to provide a method for weaving a pile fabric wherein the entire fabric can be made heavy and more compact because of the variation of yarn heights, which may be used to thereby present a heavier weight fabric having longer wearing qualities, together with a lush pile also combining the embossed motif as well as the less apparent motif, thus greatly adding to the beauty of the rug or carpet.

Still another object of the invention is to provide a method to produce a pile fabric wherein various weights of yarns may be used so that the pile may be formed of yarns of one weight while the uncut yarns will be of a different weight to thus provide the desired contrast as well as serviceability to the rug.

Still another object of the invention is to provide a method for weaving a fabric formed on a loom wherein each course is twice as heavy as has heretofore been the custom, so that an extremely heavy ribbed effect may be noticed with the extra yarn ends firmly clamped together and held in place by the double chains and stuffers.

With these and other objects in view, the invention consists in certain new and novel features and combination of parts, as will be hereinafter more fully explained and pointed out in the claim.

Referring now to the drawings showing a preferred embodiment of my pile fabric and the method of making the same,

Fig. 1 is a top plan view of a piece of pile fabric showing a primary motif, wherein the cut pile and uncut yarn form the flower and wherein the absence of pile yarn forms the outline of the leaves;

Fig. 2 is a fragmentary diagrammatic view of the yarn being fed to the loom;

Fig. 3 is a diagrammatic view showing the conventional courses with the yarn ends;

Fig. 4 is a similar view showing my new arrangement;

Fig. 5 is a view of the conventional weave of several courses as seen from the rear;

Fig. 6 shows my new and improved weave when the courses and yarn are arranged as shown in Fig. 4 and as also viewed from the rear; and

Fig. 7 is a fragmentary diagrammatic sectional view of my improved pile fabric, showing the cut pile, uncut yarns, and the absence of yarns in the face of the fabric, and for the simplicity of illustration I have shown only five of the yarns rather than ten.

Referring now more particularly to the several views, it will be understood at the outset that the drawings are merely illustrative of the preferred form of the invention and are diagrammatic in their nature.

The diagrammatic view of the loom is to show how the yarns of different weight may be utilized to form the new fabric. The mechanical change necessary in the standard loom is to change the pitch, which is accomplished by changing the reed or comb, which is, of course, divided into a number of slits. Briefly stated, a loom with a two hundred and fifty-six (256) pitch has a reed or comb comprised of two hundred and fifty-six (256) slits, through each of which passes a course. Due to the fact that different design units require different weights of yarn to make them sharp and satisfactory, looms may be readily adjusted with reeds of slightly different pitch in order to provide sufficient space for the yarns, chains, and stuffer ends which are to be drawn through them.

In order to obtain the weave that I am about to illustrate, the loom is set up in such a way that

the same loom will draw the equivalent of two hundred and fifty-six (256) courses through a reed having only one hundred and twenty-eight (128) slits. In other words, the same number of courses that are ordinarily used in a loom having a pitch of two hundred and fifty-six (256) are now arranged in the loom having a pitch of only one hundred and twenty-eight (128) or half of what has been the usual practice.

Thus, in my new and improved weave, there will be passed through each course four chain ends, four (more or less) stuffer ends, and the equivalent in weight of four "twenty-four (24) yard" yarn ends and six "fifty (50) yard" yarn ends, distinguished from the conventional weaving of a course with two chain ends, two stuffer ends, and the equivalent of five yarn ends of fifty yarn weight in a three-quarter yard carpet loom having a two hundred and fifty-six (256) pitch.

It will be noted that these weights of yarns mentioned in my new method may be varied and are set out as exemplary of the manner in which the multiplicity of yarns of light and heavy weights may be run through half the number of slits.

It is also to be noted that it is not necessary to double the number of yarns but it is desirable to invariably double the usual or customary total weight of yarns drawn through each course. It might further be desirable for an extremely soft motif to have, say, fifteen yarn ends as compared to ten. The comparison is in the total weight of all these yarn ends, stuffers, and chains rather than their number. Although it is still further desirable to use a normal complement of twice the number of stuffers, it might be possible, due to the type of effect wished, to eliminate one of the stuffers and weave satisfactorily with only three, making up the weight thus saved in the absence of a stuffer by the use of heavier yarns.

In other words, the total weight of yarns, stuffers, etc. of the new course is to be double that of the weight of the old course.

Referring now for the moment to Fig. 2, there is diagrammatically shown as much of the weaving portion of a Jacquard loom as is thought necessary to illustrate the method for carrying out the invention.

Glancing at the figures for the moment, there may be seen the stuffer beam 1 and the chain beam 2 together with the lay sword 3 having the reed or comb 4, through which the various yarns pass to the spike roller 5, certain of the yarns being acted on, of course, by the pile wire cutters 6, while others of the loops, as will be mentioned, are passed about the pile wires but are not cut. The pile wires, of course, are situated above the breast plate 7, as is the conventional method.

Also there may be seen the stuffer heddle 8, the chain heddles 9 and 10, and the lingoes 11, which latter, of course, are operated from the jacquard cards.

All of the above parts are conventional, with the exception of the reed or comb which, in this instance, instead of having a pitch of two hundred and fifty-six (256) has a pitch of one hundred and twenty-eight (128) and, in reality, two ordinary courses pass through each slit. The yarn ends are drawn from the frames (not shown) through the needle eyes 12 in the lingoes, which are controlled by the jacquard cards (not shown). The raising of these lingoes, through which pass certain weights and types or colors of yarn, determines the color and type and design or motifs on the fabric when properly set up to cooperate with the pile wires, some of which are provided with cutters and some of which are not, so that the yarns may be looped about the latter but not cut on the withdrawal of the pile wires.

The stuffers 13 are drawn from the stuffer beam 1 while the chains are drawn from the chain beam 2 through their respective heddles 9 and 10.

The course comprised of the proper number of chains, stuffers, and yarn ends is lifted through the slits of the reed or comb 4, at which point the yarns become engaged with the nearest pile wire 6 and the customary crosswise shot yarn (not shown) is positioned. The lay sword 3 passing from left to right will force the weave tightly together and the yarn over the pile wires and up to the breast plate 7, after which the pile wires "whip" through, leaving the finished fabric that rolls forward with each successive action of the loom and which fabric passes over the spike roller 5 in the conventional manner.

In Fig. 3, there is schematically shown a cross section of part of a reed illustrating the composition or arrangement of eight typical or conventional courses within the eight slits of a two hundred and fifty-six (256) pitch reed. As heretofore mentioned, there may also be seen the two chain ends C—E, two stuffer ends S—E, and five yarn ends Y—E of approximately fifty yarn weight. This weave produces a carpet or fabric, as fragmentarily shown (rear) in Fig. 5. Here may be seen the chains or binder chains C—E together with the yarn Y and the stuffer yarns held by the weft thread shots S.

Now with a pile fabric made in the above manner, it is possible to produce a motif caused by the cut pile and the uncut yarn, which motif is controlled, of course, by the jacquard cards. However, it is impossible or impractical to use a weave of this kind to also produce, besides the motif formed by the cut pile and the uncut yarn, a further secondary motif or part of the main motif by providing a pattern formed by absence of cut pile and yarn in the face of the fabric.

However, with the new weave and a doubling of the size of the course, it is possible not only to form a motif with the cut pile and the uncut yarn, but I can also produce a subtle motif by an absence of yarn and its cut pile following a distinct pattern. Thus, for instance, a flower or petal may be formed with the cut pile and the uncut yarn, while the thin line or outline of a leaf may also be formed by an absence of the cut pile.

It will be understood that the pile adjacent the edges of the motif line will tend to spread or "blossom" and especially after being walked on, so that there is just a faint outline of the motif, which, however, is discernible when viewed from different angles, thus creating a very pleasing effect to the pile fabric.

Referring now to Figs. 4 and 6, and for the moment to Fig. 4, there is shown a portion of the comb or reed and in this instance, instead of having eight slits, it will be noticed that there are only four. It will also be noticed that in this instance, we have four chain ends C—E, four stuffer ends S—E, four "twenty-four (24) yard" yarn ends Y—E, and six "fifty- (50) yard" yarn ends Y—E'. These numbers are illustrative, as the weights may be varied.

Thus, in the new weave, the chains are doubled, the stuffer yarns are doubled, and the

yarn ends are doubled, and also the heavier and lighter yarns may be used in the one course, so that the uncut yarn may be more apparent in the motif and additionally provide, of course, a heavier and longer-wearing carpet.

In Fig. 6 may be seen the binder chains C—E, and in this instance, there will be one above the other and there may also be seen the yarns Y—E and the stuffer yarns S—E. These yarns and stuffer yarns may be intermingled in any desired manner and are held by the conventional weft shots S. The six "fifty (50) yard" yarn ends and the four "twenty-four (24) yard" yarn ends may be varied to suit the desired motif. Thus, it will be seen that in the one course, I have doubled the yarn, chains, and stuffers.

By having this number of yarn ends, chains, and stuffers in the one course, it is possible to form the motif of cut and uncut yarns, which latter, being relatively heavy yarns, stand out more distinctly and provide a greater contrast to the eye, as may be seen in Fig. 1. These uncut yarns, of course, are yarns that are passed over the pile wires, but the pile wires being devoid of spoon and cutter blades withdraw, leaving uncut loops.

It might also be mentioned in passing that the pile wires, about which these uncut loops are passed, may be of different sizes, widths, or height to accommodate the coarser or heavier yarn and to provide longer loops for the pile.

Furthermore, it is thus possible to provide a subtle pattern by running certain of the yarns into the base of the carpet and thus leave a slight space between the cut pile.

In Fig. 7, I have illustrated the cut pile, as may be seen at P, the uncut yarn, as may be seen at *p*, and an absence of raised yarn and, therefore, absence of pile, as at 14. Here the yarn has been left unraised from the face of the carpet and bound down into the base to thus provide a space forming a pattern running through the pile. The cut pile, however, adjacent the portion 14 tends to spread or blossom, so that the motif formed by the absence of raised yarn ends (the yarn here being bound into the base) produces a design that is not as readily apparent as the cut and uncut pile but, nevertheless, may be clearly seen by different refractions of light. It will be noticed that for the simplicity of illustration, I have shown only five yarn ends Y—E rather than ten.

Thus, it is possible to weave in the one piece of pile fabric a combination of the pile tufts and uncut pile yarn to form one part of the motif and to provide a second part or secondary motif in the same fabric by an absence of pile yarn in the face of the pile fabric. A further motif of raised or embossed effect can also be obtained through the use of wider pile wires, properly positioned.

It is necessary to have a course with the multiple chains and stuffers and yarns, all as above-described, in the weave to make possible these motifs caused by the two methods above-outlined.

It will also be understood that it would not be possible to force all these yarns, chains, and stuffers of one course into the respective number of the slits, as shown in Fig. 3, and if they were admitted, the material would be so tight that the lingoes could not raise the required ends without tearing or breaking them.

It also follows that if the courses of the customary sized number were used, as shown in Fig. 1, and drawn through this reed with a reduced number of slits, the pile would be so scant that there would be virtually no design whatever in the fabric.

Each course being twice as heavy and provided with yarns of relatively heavy weight bound in with double chain ends produces a very heavy ribbed effect, as will be noticed in the design shown in Fig. 1. Thus, there is provided on the face of the fabric, where the woven loops of yarn are cut, an exceptionally heavy and luxuriant blossoming or spreading of the pile from the tightly bound yarns.

Also the entire fabric can be made heavier and and more compact because the yarn weights may be varied, and it is possible to provide for cut and uncut yarns and further to provide an absence of yarn to form what might be termed a carved effect (the absent yarn ends disappearing at the back or base of the carpet rather than pulled up by lingoes to the face of the fabric), an embossed effect being obtained through the cut pile and the proper positioning of pile wires of relatively greater width and height than otherwise used.

From the foregoing, it will be seen that by changing the comb or reed, I can double the number of chains, stuffers, and yarns in each course and vary the weights of the yarns to produce different effects. I can also provide an outline in the pattern by an absence of yarns or uncut pile to thus provide a most pleasing and novel effect in the one piece of pile fabric.

Furthermore, the pile fabric may be made heavier to thus provide longer wearing qualities and the motifs formed by the two different methods will present a pleasing appearance during the entire life of the rug.

Having thus described the pile fabric and my method of making the same, what I claim as new and desire to secure by Letters Patent is:

The method of weaving a patterned pile fabric on a loom of the Jacquard type which comprises halving the number of slits used on a standard reed and segregating into longitudinal courses thereby double the standard number of chain warps for forming the base and at least double the pile warps for forming the surface, drawing through each slit two types of pile forming warps, one of light weight and one of heavy weight, shedding the chain warps and inserting wefts both above and below the pile warps, shedding selected heavy weight pile warps according to pattern and inserting low non-cutting pile wires into the shed thus formed, lowering said selected heavy weight pile warps, again shedding the chain warps and inserting weft to bind in the pile loops thus formed, shedding selected light pile warps according to pattern and inserting high cutting pile wires, lowering said selected light pile warps, again shedding the chain warps and inserting weft to bind in the light pile warps withdrawing the non-cutting and cutting pile wires of the pile loops after they are formed whereby both longitudinally and transversely of the fabric being woven low uncut pile and high cut pile areas are formed adjacent each other, and simultaneously with the forming of said cut pile areas leaving selected pile warps lowered into the base without shedding in accordance with a predetermined pattern whereby lines of pile voids are formed in the cut pile areas.

HAROLD H. BAYNTON.