May 17, 1960 C. R. IBACH, JR 2,936,513

TUFTED FABRIC

Filed June 8, 1956 2 Sheets-Sheet 1

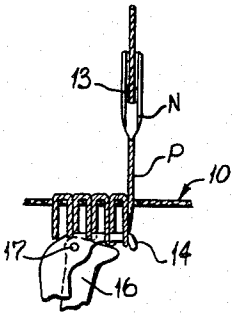


Fig-2

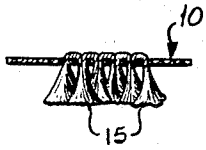


Fig-3

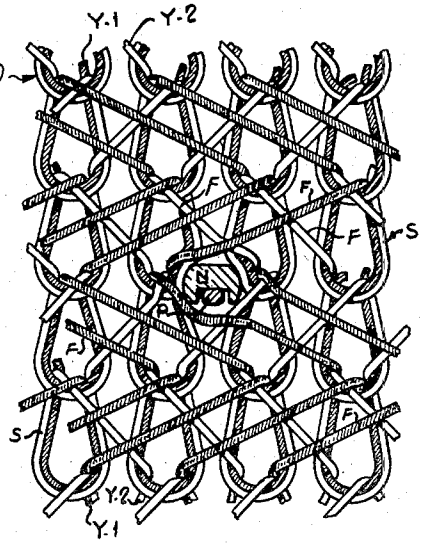


Fig-4

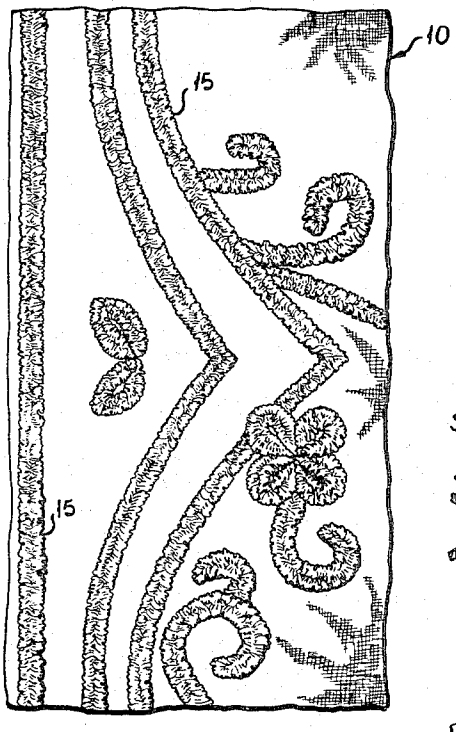


Fig-1

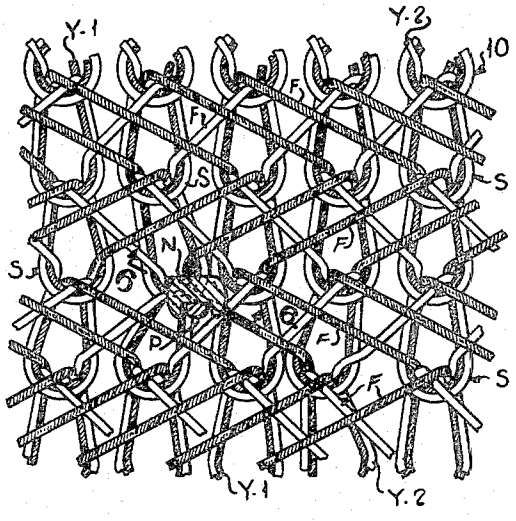


Fig-5

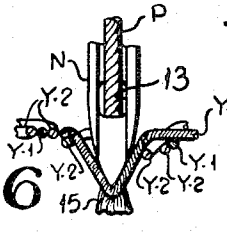


Fig-6

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TUFTED FABRIC

Filed June 8, 1956 2 Sheets-Sheet 2

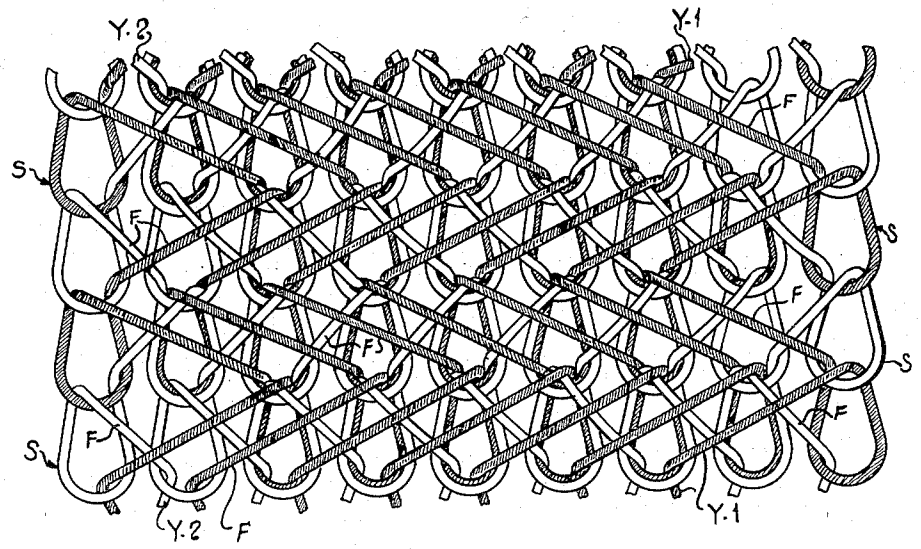


Fig-7

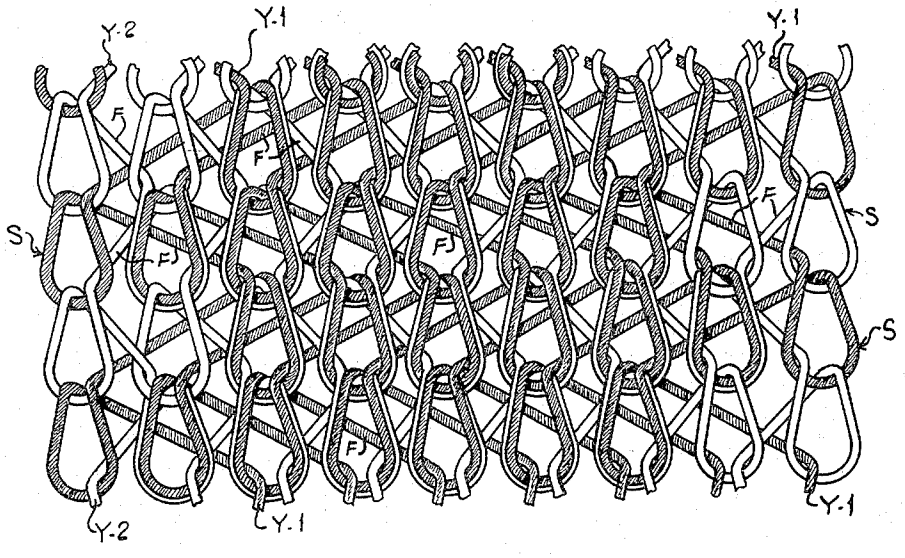


Fig- 8

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2,936,513

TUFTED FABRIC

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Application June 8, 1956, Serial No. 590,309

3 Claims. (Cl. 28—78)

This invention relates to pile fabrics and, more especially, to "chenille" fabrics having ornamental designs formed by inserting pile yarn in a fabric base.

It is well known that the base of chenille fabrics of the character described is woven from cotton yarn or yarn that is predominantly cotton and irregular tufted or loop pile designs are formed on such base by a sewing machine. During the insertion of the pile yarn in a woven cotton base, the needle of the sewing machine frequently severs the yarn in the base, thereby resulting in short loose ends of yarn and weakening the base to the extent that pile loops or tufts are easily withdrawn from the base. This defect is overcome to a certain extent by shrinking the fabric after the pile yarn is attached to the base.

However, a cotton or similar woven base fabric has a coarse texture and all base fabrics woven from cotton or any other material are easily distorted. That is, suspended chenille bedspreads, draperies or the like tend to "sag" at portions having relatively large amounts of pile yarn attached thereto as compared to other portions having little or no pile yarn attached thereto.

Because of the smooth lustrous texture of fabrics made from nylon and other synthetic yarns, I have attempted to produce a chenille fabric having a base made from synthetic yarn. Such attempts have been unsuccessful, heretofore, because the synthetic yarn base was woven. In order to secure the pile yarn to the synthetic yarn base, a close weave such as a satin weave or twill weave was required, but the sewing machine needle would then sever or fracture one or more synthetic strands with each pile-yarn-inserting stroke thereof, and the severed and/or fractured strand, combined with the displacement of synthetic strands by the needle and pile yarn, would cause objectionable puckering of the synthetic yarn base.

It is an object of this invention to provide an improved chenille fabric wherein the fabric has a smooth, unwrinkled and stable base to which cut or uncut pile yarns are securely attached to form distinct raised tuft or loop areas of any desired configuration on either or both sides of the base.

It is another object to provide a chenille fabric of the character described in which the base is warp knit as, for example, tricot, Raschel or Simplex knit, as opposed to circular knit fabric, and made from synthetic yarn such as nylon, acetate, "Dacron" or combinations thereof.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which:

Figure 1 is a fragmentary view of a portion of the improved chenille fabric showing a tufted design thereon made from a pile yarn attached to a warp knit base fabric, which design is exemplary of many different types of tufted pile or loop pile designs which may be made in accordance with the present invention;

Figure 2 is a schematic view showing the needle and cutting means of a sewing machine and illustrating how they cooperate in inserting pile yarn in the base fabric and cutting the doubled portions of the pile yarn;

Figure 3 is a fragmentary inverted sectional view through the base fabric showing a few of the tufts projecting therefrom;

Figure 4 is a greatly enlarged fragmentary view of the back face of the tricot base fabric used in forming the

fabric portion shown in Figure 1, and showing how the yarn is deflected as the pile-forming needle passes through one of the loops or stitches of the fabric;

Figure 5 is a view similar to Figure 4 showing how the yarn is distorted and "borrowed" from adjacent stitches when the end of the needle engages and forces a portion of the yarn in the base fabric out of its normal position without parting the corresponding yarn portion;

Figure 6 is a fragmentary sectional view taken substantially along line 6—6 in Figure 5;

Figure 7 is a fragmentary view looking at the back face of a portion of the base fabric shown in Figure 1, omitting the pile yarn;

Figure 8 is a greatly enlarged fragmentary view of the front face of a portion of the warp knit base fabric of Figure 1 omitting the pile yarn.

Referring more specifically to the drawings, the portions of warp knitted base fabric shown in each of the views are each generally designated at **10**. Any of many types of warp knitted fabrics may be used for the base, such as tricot, Raschel, Simplex or the like and, for purposes of description, the base fabric will frequently be termed hereinafter as tricot fabric. The tricot knitted fabric is illustrated in Figures 4, 5, 7 and 8 as a so-called "two-bar" tricot fabric of well known construction. The two-bar tricot fabric is merely exemplary in that it is representative of many different types of tricot or other warp knit fabrics which may be used as the base for the improved chenille fabric. In other words, a single bar or three-bar warp knit fabric or a two-bar pique ribbed pattern or irregular warp entry pattern and various mesh warp knit fabrics may be substituted for the particular two-bar tricot fabric illustrated in Figures 4, 5, 7 and 8.

All of such warp knit fabric constructions are generally well known, and many of them are clearly disclosed in a reference manual entitled "Tricot Fabric Design" by Thomas Johnson, published by McGraw-Hill Company, Inc. of New York. Accordingly, a detailed description and illustration thereof is deemed unnecessary. A common characteristic of all types of tricot knit fabrics is that loops or stitches, such as are generally designated at S, are formed as wales and courses on the front face of the fabric while floats, generally designated at F, are formed on the back face of the fabric, the floats serving to connect the stitches or loops of the stitches and each of said floats extending from the base of one stitch in a given course to the base of another stitch in a subsequent course.

In a two-bar tricot fabric, each of the stitches, with the exception of those appearing at the selvages of the fabric, is formed from two yarns Y–1 and Y–2, a plurality of the yarns Y–1 usually being drawn from a separate warp beam than that from which a plurality of the yarns Y–2 are drawn.

Referring now to Figure 2, pile yarn P is inserted in the base fabric **10** by means of a substantially vertical reciprocating needle N having an eye **13** through which the pile yarn P passes in its course from a suitable source, not shown, through the fabric **10** and to a looper **14** about which the pile yarn P is looped as it is inserted in a base fabric **10**. In order to produce chenille ends or a cut pile, and a consequent soft texture to pile design areas or rows of pile such as are indicated at **15** in Figure 1, the looper **14** is preferably provided with a movable cutter **16**, pivoted at **17** on the looper **14** and which is adapted to have movement with relation to the lower edge of the upper portion of the looper **14** and act in the manner of a pair of shears or scissors. The needle N, the looper **14** and the cutter **16** are usual parts of a commercial sewing machine, such as is illustrated in U.S. Patent No. 1,984,772, issued on December 18, 1954 to W. C. Stewart and, since the construction and opera-

tion of such machines are well known in the art, a further description thereof is deemed unnecessary.

The portions of the fabric shown in Figures 2 and 3 are inverted as compared to the portion of fabric shown in Figure 1, since the front face of the fabric usually faces downwardly during the insertion of the pile yarn P therein to form loops or tufts by means of the particular sewing machine illustrated. There are many different ways in which the pile loops or tufts may be formed and they may even project from both faces of the base fabric **10** according to the manner disclosed in U.S. Patent No. 2,705,465, issued to Edward D. Lacey on April 5, 1955. Also, the pile yarn P may be any desired type of textile material such as cotton, nylon, etc.

The warp knit tricot fabric made from synthetic yarn has an important characteristic which does not exist in a woven fabric, to the extent that, when the needle N penetrates the warp knit fabric, although the needle may be of substantially greater diameter than the corresponding stitch through which it passes, the corresponding stitch is distorted and yarn is "borrowed" from immediately adjacent stitches and, as the needle is withdrawn from the fabric, leaving a portion of the pile yarn therein, the yarn previously borrowed from adjacent stitches springs back to substantially its original position to lock the pile yarn in the base and so the resultant chenille fabric is entirely devoid of puckering. Also, although the needle, in its downward course, may be directly in alinement with a portion of the yarn in the tricot knitted fabric **10**, the yarn merely moves downward with the needle relative to the body of the base fabric or the corresponding portion of yarn may be deflected to one side of the needle due also to the fact that the yarn can be borrowed from adjacent stitches. Thus, not only is the fabric devoid of distortion or wrinkles adjacent the rows of pile **15**, but also the yarns in the base fabric are not severed or fractured, as is the case when a woven base fabric is used.

Another important characteristic of a tricot warp knitted base fabric as compared to that of a woven fabric resides in its inherent stability; that is, it will not become bowed or skewed or otherwise distorted when portions thereof are subjected to greater stresses than other portions thereof, or, in other words, adjacent wales and courses will not yield relative to each other under their own weight or the weight of the pile yarn, either individually or in groups, although individual stitches will yield to a certain extent when the pile yarn is inserted in the warp knitted base fabric.

As heretofore stated, Figure 4 illustrates how the needle N passes through in the base fabric **10** and only causes a slight distortion of the loops or stitches adjacent and between which it passes and, because of the particular characteristics of tricot warp knit fabrics, the loops tend to return to their normal configuration when the needle is withdrawn and, thus, the yarn trightly wraps itself around the pile yarn P so it is tightly enmeshed in the ground fabric **10**.

In Figures 5 and 6, it will be noted that the sharp lower end of the needle is directly in alinement with a portion of the yarn and has engaged and forced one of the floated portions of the yarn downwardly, as the needle passed through the body of the base fabric **10**, so the corresponding float is placed under tension and has caused adjacent stitches to converge somewhat toward the needle N. Of course, nearly all yarns have a certain amount of inherent resiliency and this, combined with the flexibility of stitches as compared to the weft and warp of woven fabrics, permits the corresponding portion of yarn engaged by the sharp end of the needle to be deflected substantially out of its path and, as the needle returns to raised position, all the stitches, and the corresponding portion of yarn which was deflected, spring back to substantially their original positions, thereby avoiding the occurrence of distorted or puckered portions

in the base fabric adjacent the lines of pile or pile areas **15**, even though the yarns may be deflected out of their normal positions at times during the insertion of the pile yarn P.

It is thus seen that I have provided a novel method of producing chenille fabrics wherein a warp knit base fabric is utilized and pile yarn is inserted in the warp knit base fabric to form chenille designs resulting in a smooth uninterrupted base fabric with sharply defined loop pile or cut pile areas.

Although the tricot knit fabric has been described herein as being made from a synthetic yarn, which is highly desirable, it is contemplated that yarns made from other materials may also be used although a continuous filament yarn ordinarily has a greater tensile strength than that of a staple yarn and also has a greater inherent stability or tendency to return to its original position when it has been distorted due to the needle end engaging the yarn as heretofore described with respect to Figures 5 and 6.

In the drawings and specification there has been set forth a preferred embodiment of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. A pile fabric comprising a tricot knitted base having parallel courses of stitches with floats connecting the stitches together and extending from the base of one stitch in a given course to the base of another stitch in another wale and a subsequent course, and a plurality of doubled portions of pile yarn extending through said base from one side to the other in a predetermined pattern to form pile on at least one side of said base.

2. A pile fabric according to claim 1 wherein at least some of the doubled portions of pile yarn are cut to form tufts.

3. A pile fabric according to claim 2 wherein the pile yarns are of a larger diameter than the yarns of the tricot knitted base to thereby be more effectively anchored in the tricot knitted base.

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