

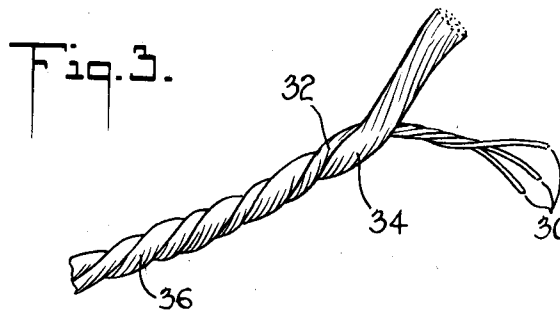
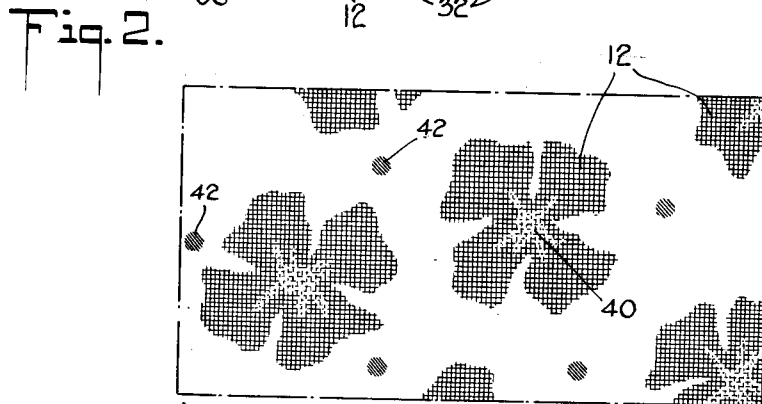
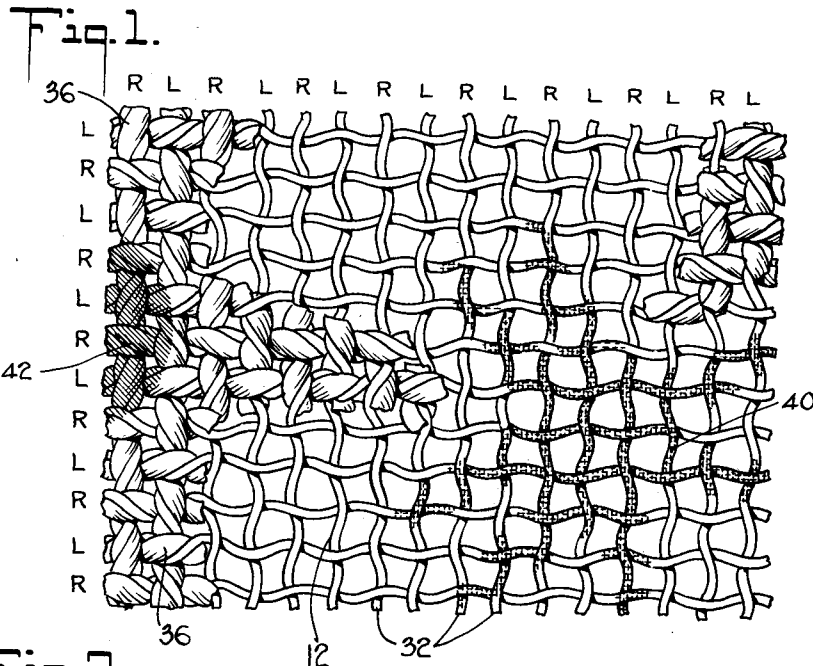
April 17, 1934.

E. I. GOLDING

1,955,582

FABRIC

Filed Jan. 10, 1934



INVENTOR
Edwin I. Golding
BY *William H. Hub*
ATTORNEY

UNITED STATES PATENT OFFICE

1,955,582

FABRIC

Edwin I. Golding, New York, N. Y.

Application January 10, 1934, Serial No. 706,030

8 Claims. (Cl. 28-1)

This invention in one of its aspects relates generally to woven fabrics and in another of its aspects relates to a yarn to be employed for the production of a woven fabric and to a woven fabric so produced and coordinately relates to the production of pattern effects in woven fabrics.

From the standpoint of the woven fabric generally it is the object of my invention to produce a crepe fabric which will be finished alike on both sides and in both directions; i. e. in the direction of the warp as well as in the direction of the weft. This object I attain by employing crepe yarn for both the warp and the weft, and by alternating the yarns in both between a right twist and a left twist.

From the standpoint of the woven fabric in a more specific aspect, it is the object of my invention to produce a woven fabric in which a pattern effect is attainable by subjecting predetermined areas of the fabric to a special treatment, such as a chemical reaction, both the weft and the warp threads within said areas being responsive to such treatment.

This object I attain by employing in both the warp and in the weft, a yarn comprising in part threads or filaments which dissolve or disappear when subjected to the action of certain chemicals and then subjecting predetermined areas of the fabric to the action of such chemicals.

By employing substantially the same composite yarn for both the warp and the weft, the fabric will be symmetrically constructed throughout, and there will be no distinction between the warp and the weft threads, and in fact, no way of distinguishing between the two except by the presence of a selvage on the opposite sides of the fabric length. Such a fabric will be capable of almost unlimited treatment for pattern effects by a process such as set forth, somewhat as is the printing of patterns upon the surface of a sheet of paper.

From the standpoint of the production of a pattern effect, it is a further object of my invention to attain this by providing areas which contrast with each other, not only in the character of the fabric structure, but also in its color, which, of course, gives rise to the problem of registration in these two factors of contrast. This object I attain and this problem I solve by incorporating with the chemicals for varying the fabric construction of predetermined areas, a material which will color such predetermined areas, thus eliminating the problem of registration. The elimination of this problem serves its purpose in a fabric in which only the warp or only the weft

is made up of composite yarn as above set forth, and therefore it is not to be considered as restricted in its functioning, except as called for by the language of the claims.

As some of the aspects of my invention contemplate the employment of a composite yarn for fabric weaving and the removal, as by a chemical process, of lengths of one of the constituents of said yarn to define the patterned area, the removal of such lengths will leave loose ends. It is therefore a further object of my invention to provide a yarn in which such loose ends will be automatically locked in position, and this object I attain by the employment of a composite yarn, the constituents of which are interlocked throughout their entire length.

For the attainment of these objects and other objects as will hereinafter appear or be pointed out, I have illustrated one embodiment of my invention in the drawing, wherein:

Figure 1 shows the fabric structure of a patterned section on a greatly enlarged scale;

Figure 2 is a view on a greatly enlarged scale, the pattern effect of this section; and

Figure 3 is a view on a greatly enlarged scale of a yarn adapted for use in my fabric.

Before proceeding to a detailed description of the drawing, I will premise that the fabric herein disclosed employs a crepe yarn in both the warp and the weft, that the crepe yarn alternates between a right twist and a left twist both in the warp and the weft, and that such yarn is composed of different materials such as silk and rayon associated together in a manner and proportioned, as dictated more or less by the effect desired.

I will now proceed to describe in detail, one manner of producing a crepe yarn of the type capable of employment for purpose of effecting my invention, it being understood, however, that this is merely illustrative, and will be subject to variations as dictated by factors such as the type of fabric which it is desired to produce.

In Figure 3 I have attempted to show both the manner of formation and the composition of a yarn which I may employ. At 30, I show three strands of an appropriate denier silk, such as 14, twisted together to a high twist as for example of the order of substantially sixty-five turns to the inch. The single thread 32 formed as described is then set as for example by exposure to steam in the manner well known. The element 32 forms the silk component of the yarn I employ and has associated therewith a rayon component shown at 34 in Figure 3, and formed and

associated with the silk component, all as shown in Figure 3.

The rayon component 34 is illustrated in the drawing by way of example as a one hundred denier rayon twisted fifty times to the inch and also set as by steam. The threads 32 and 34 are now twisted together ten times to the inch as shown in Figure 3, and the yarn so formed then set also by steam. In this manner I attain the composite yarn 36 to be employed as and for the purposes to be set forth, and before proceeding to a description of the manner of formation of the fabric from such yarn, it will be understood that while I have shown in Figure 3, the yarn as twisted to the left, that is clockwise, it will be understood that for purpose of fabric formation I employ such yarn twisted clockwise i. e. to the left, in alternation with similarly formed yarn twisted however counter-clockwise, that is, to the right, as will be more fully set forth in connection with the formation of the fabric shown in Figure 1.

In Figure 1 I show a simple weave employing both in the warp and in the weft, the yarn formed as shown in Figure 3, and upon viewing this Figure 1 it will be observed that both in the warp and in the weft, the composite yarn is alternated as between a right twist, and a left twist thus producing what might be termed a double crepe fabric.

It will be observed that this fabric is symmetrical as to the characteristics of the yarn from which it is formed, both as to the warp threads and as to the weft threads, and I will now point out of the importance of this arrangement in connection with the production of a pattern by the process employed by me.

For a composite yarn comprising silk and rayon, I select a chemical reagent which will dissolve or burn out the rayon constituent of the yarn in the fabric, and which, when applied thereto, will leave the silk substantially intact, and the fabric area to which it is applied, reduced in bulk both as a fact and to the eye. By applying such reagent by a printing process, similar to those well known in the textile arts, I am enabled to thus produce patterns in the fabric, that resemble hand-drawn and Jacquard effects and in which the design stands out as transparent against a solid background, this effect of course resulting from the removal of sections of the rayon constituent over an area as predetermined by the design and leaving only silk in such area. Such a design is indicated at 12 in Figure 2.

One of the important features of my invention is the selection of two threads to form the yarn, each of which threads is water absorptive and therefore will shrink at the boil off. Such threads will shrink during the boil off to give an enhanced creping result. Silk and rayon answer to this selection.

Another important feature of my invention is the twist of the silk and rayon fibers in the same direction and more particularly to a relatively high order and the twist of both together to increase the order. As a result of this, the two twisted strands so associated will not only each shrink during the boil off but the bond already established between the two before boil off by the twist in the same direction will be materially increased by the shrinking of each effected during the boil off, and in this connection it is further an important feature of my invention that in order to give a balanced shrinkage attained by the differential in the twist of the two compo-

nents and in the instant case by a twist of the relative orders of sixty-five turns to the inch to fifty turns to the inch and then by a twist together in the same direction of ten to the inch.

All of this gives the general result which it is desired to attain, namely that the rayon and silk threads be locked to each other so that when an area is treated chemically to remove one of the constituents as for example rayon sections there are no free rayon ends to unravel.

By the term "boil-off" hereinbefore mentioned, is to be understood the treatment of fabrics by boiling water so as to remove soluble constituents thereof, such as for example, to remove sericin from the threads of silk fabrics.

Another of the important features of my invention is that the pattern produced by the process above referred to is continuous and uninterrupted, either by weft threads or warp threads which are unaffected by the chemical treatment to which a fabric area has been subjected, and upon viewing the patterns illustrated in Figures 1 and 2, it will be observed how the design runs continuously and uninterrupted through the wefts and warps and gives the unbroken sheer effect of the silk which remains in the pattern, and enhanced as it is by the rather heavy background produced by the heavier rayon, and in this connection of course it will be understood that by changing the proportion of the two ingredients this question of the relationship of the silk pattern and the background can be altered within limits as desired, not only as to fabric pattern as an entirety, but to give a pattern effect even within the sheer silk pattern areas.

In this connection it may be of interest to note that by employing a fabric structure which is symmetrical with reference to both dimensions as above pointed out, pattern effects can be produced without limit, and without regard to the direction or relation of the warp or the weft with reference thereto because the fabric is identical in both directions. In fact, where the same yarn is employed for both the warp and the weft, there will be no way of determining from an inspection of the fabric section which are the warp threads, and which are the wefts, except by means of the selvage, if this is not removed.

Another important feature of my invention results from the employment of a composite yarn in which the two constituents are twisted together throughout their entire length as fully described in connection with Figure 3. When rayon sections of both warp and weft are removed, to give the pattern effect of Figures 1 and 2, removal of such sections will leave loose ends which otherwise might or would present obstacles to the successful employment of my invention. However, the continuous twisted interengagement between the rayon thread component and the silk thread component virtually forms an interlock of the rayon thread with the silk thread throughout its entire length and which remains effective even upon the removal of lengths of the rayon thread for pattern producing purposes.

My invention further contemplates the enhancement of the pattern effect by contrasting the patterned areas not only in the manner already described, but also by having the pattern therein contrastingly colored. This I accomplish by using with the chemical reagent employed for burning out the rayon, a coloring matter to which silk will react or to which silk can be made sensitive by special treatment such as by a mordant. This is important because as the patterned effect

resulting from the burning out process and the effect resulting from the coloring are applied to the same area simultaneously by a single medium, the question of registration of these two effects is entirely eliminated.

It will be understood of course that the formation of the yarn employed by me from silk and rayon is intended to be merely illustrative, and that the chemical reagent to be employed will be determined by the characteristics of the constituents employed for making the yarn, and by a determination of which of the constituents it is desired to remove, and it will further be understood that the yarn need not be made up of but two constituents.

The high order of twist employed by me serves advantageously both from the standpoint of the formation of a crepe fabric, as well as for the purposes of locking the loose ends left by the removed sections.

The provision as to the composite character of the yarn employed is not necessary as to the broad phases of my invention that involves production of a fabric with a double crepe effect, and this phase of my invention is not to be so interpreted unless called for by the language of the claims.

The color area for design purposes need not be coterminus or identical with the patterned areas produced by removing yarn sections. For example, the color can be applied to a smaller section of such area as it has been attempted to show by the reference character 40 in Figures 1 and 2 or the color can be applied to areas which are unaffected by the chemical and which have not had portions of the yarn removed, such color application being shown at 42 in these figures.

Where the color is to be over an area identical and coterminus with the area that has been chemically treated for yarn removal, then the yarn removal and the color application can be performed as one and the same step as by mixing together the coloring material and the chemical, and applying them both as one. Where on the other hand such is not to be the fact, one applicator will have to be used for the chemical and another applicator for each color.

I have herein disclosed one process of, and specified constituents employed in, forming the yarn, and I have described the employment of only this type of yarn in the weaving process. It will be understood that this is merely by way of illustration of one way of producing the yarn and of one type of yarn to be employed and of one type of fabric to be produced. By varying the constituents or their proportioning or the manner of their association or the manner of their employment in the weaving process, innumerable variations can be attained in the woven fabric, and in the patterned effects produced therein. It will therefore be understood that my invention is to be given as broad a scope as the language of the claims will permit.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is:

1. A patterned fabric comprising a patterned area and a background therefor, the patterned area being formed in its entirety both in the weft and in the warp of silk threads twisted in one direction, the background both in the weft and in the warp being made of yarns one component of which both in the weft and the warp comprises continuations of the silk threads forming

the warps and the wefts of the patterned area and being composed of strands twisted together to a high order, and another component of the said background yarn both in the weft and the warp comprising a freely shrinkable thread which is bonded to the silk component of the background by being twisted in the same direction as that of the silk to a high order, the two components of the yarn being twisted together in the same direction as the twists of the individual components, whereby the free ends of the second mentioned component of the yarns in the warp and the weft formed at the margin of the patterned area will be bonded against unravelling or separation from the silk threads and a finished fabric will be attained.

2. A patterned fabric comprising a patterned area and a background therefor, the patterned area being formed in its entirety both in the weft and in the warp of silk threads twisted in one direction, the background both in the weft and in the warp being made of yarns one component of which both in the weft and the warp comprises continuations of the silk threads forming the warps and the wefts of the patterned area and being composed of strands twisted together in excess of forty turns to the inch, and another component of the said background yarn both in the weft and the warp comprising rayon, the rayon being bonded to the silk component of the background by being twisted in excess of forty turns to the inch in the same direction as that of the silk, the two components of the yarn being twisted together in the same direction as the twists of the individual components, whereby the free ends of the rayon component of the yarns in the warp and the weft formed at the margin of the patterned area will be bonded against unravelling or separation from the silk threads and a finished fabric will be attained and the rayon component preponderating in bulk over the silk component, whereby the patterned area will be highly transparent in relation to the background.

3. A patterned fabric comprising a patterned area and a background therefor, the patterned area being formed in its entirety, both in the weft and in the warp, of silk threads twisted in one direction in excess of forty turns to the inch, the background both in the weft and in the warp being made of yarns one component of which, both in the weft and the warp, comprises continuations of the silk threads forming the weft and the warp of the patterned area and another component of the said background yarn both in the weft and the warp comprising rayon, the silk threads being composed of strands twisted together in excess of forty turns to the inch and the rayon being bonded to the silk component of the background by being twisted in excess of forty turns to the inch in the same direction as that of the silk, the two components of the yarn being twisted together in the same direction as the twists of the individual components, whereby the free ends of the rayon component of the yarns in the warp and the weft formed at the margin of the patterned area will be bonded against unravelling or separation from the silk threads and a finished fabric will be attained.

4. The process of producing a patterned woven fabric which comprises the step or steps of weaving the wefts and warps of a yarn made of silk and rayon threads, twisted individually in the same direction to an order in excess of forty turns to the inch and then twisted together so as to in-

crease the order of twist, and then subjecting an area of the fabric to the simultaneous action of both a reagent to which one of the yarn components is inert and in which the other dissolves and a coloring material whereby a contrasting pattern effect will be given to such area by the action of the reagent in removing one of the components of the yarn from such area and which pattern effect will be supplemented by the coloring of the remaining constituent in such area.

5. The process of producing a patterned woven fabric which comprises the step or steps of weaving the wefts and warps of a yarn made of components each individually twisted to a high order in the same direction and then twisted together so as to increase the order of twist, the relative twists of the individual components being such in relation to the other characteristics of the components that said components will have substantially the same index of shrinkage when the fabric is boiled off, one of the components, however, being subject to removal when treated with a reagent while the other is inert to such reagent, and then subjecting an area of the fabric to the simultaneous action of such a reagent and of a coloring material whereby a contrasting pattern effect will be given to such area by the action of the reagent in removing one of the components of the yarn from such area and which effect will be supplemented by the coloring of the remaining constituent in such area.

6. The process of producing a patterned woven fabric which comprises the step or steps of weaving the wefts and the warps of a yarn made of silk and rayon threads, bonded to each other by being twisted individually in the same direction and in excess of forty turns to the inch and then twisted together so as to increase the order of twist, and then subjecting an area of the fabric to the action of a reagent to which one of the yarn components is inert and in which the other dissolves to remove the sections of the first mentioned yarn component within said area leaving such area as made up entirely of sections of the second mentioned yarn component, whereby the yarn components will be so bonded to each other by the character of the twist and the shrinkage

due to the boil-off that the ends of the first mentioned yarn component left by the removal of said sections will be bonded against unravelling.

7. The process of producing a patterned woven fabric which comprises the step or steps of weaving the wefts and the warps of a yarn made of silk and rayon threads, bonded to each other by being twisted individually in the same direction to an order in excess of forty turns to the inch, and then twisted together so as to increase the order of twist, and then subjecting an area of the fabric to the action of a reagent to which one of the yarn components is inert and in which the other dissolves, to remove the sections of the first mentioned yarn component within said area leaving such area as made up entirely of sections of the second mentioned yarn component, whereby the yarn components will be so bonded to each other by the character of the twist and the balanced shrinkage at the boil-off that the ends of the first mentioned yarn component, left by the removal of said sections, are bound against unravelling.

8. The process of producing a patterned woven fabric which comprises the step or steps of weaving the wefts and the warps of a yarn made of silk and rayon threads, bonded to each other by being twisted individually in the same direction to a relatively high order but, however, to such difference in orders as to balance the two both with respect to the difference in their tension under twist and their shrinkage at boil off and then twisted together so as to increase the order of twist, and then subjecting an area of the fabric to the action of a reagent to which one of the yarn components is inert and in which the other dissolves, to remove the sections of the first mentioned yarn component within said area leaving such area as made up entirely of sections of the second mentioned yarn component, whereby the yarn components will be so bonded to each other by the character of the twist and the balanced shrinkage at the boil off that the ends of the first mentioned yarn component, left by the removal of said sections, are bound against unravelling.

EDWIN I. GOLDING.

50

125

55

130

60

135

65

140

70

145

75

150