

March 24, 1953

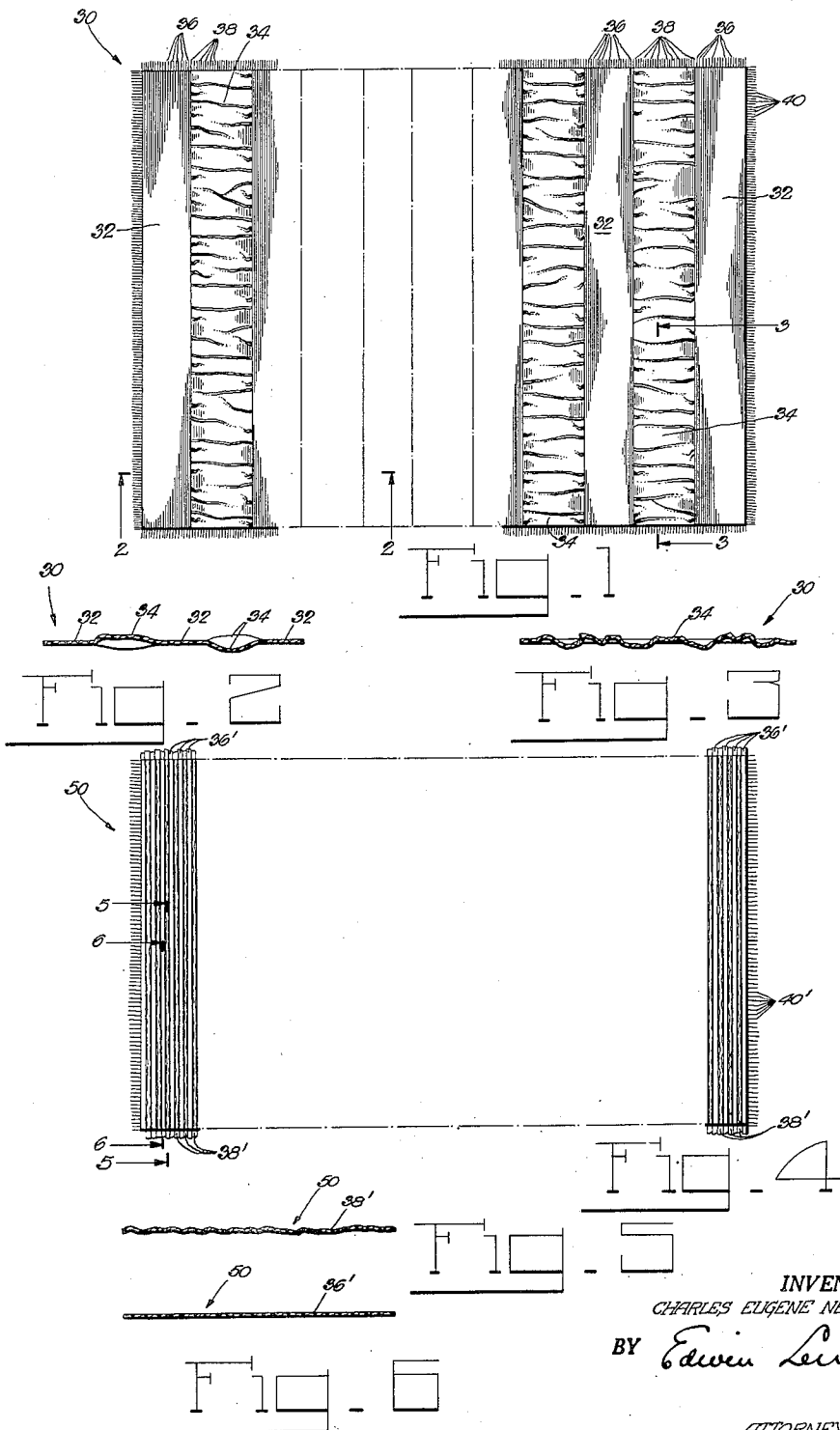
C. E. NEISLER, JR

2,632,230

TEXTILE FABRIC

Filed Jan. 6, 1949

3 Sheets-Sheet 1



INVENTOR.
CHARLES EUGENE NEISLER, JR.
BY *Edwin Lischke*
ATTORNEY.

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C. E. NEISLER, JR
TEXTILE FABRIC

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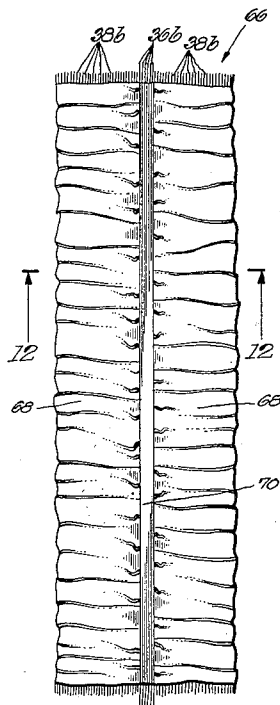
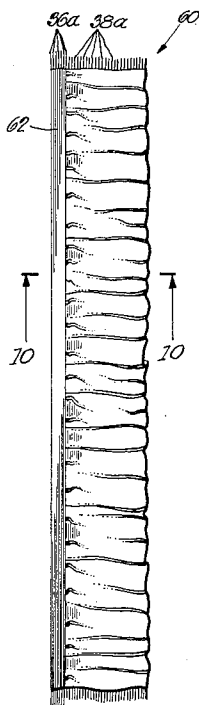
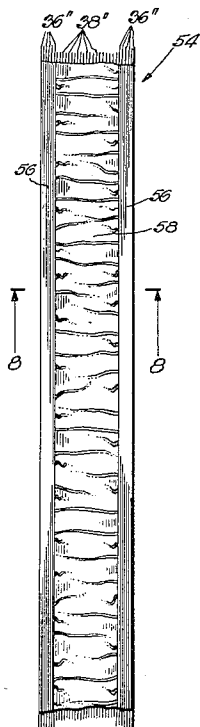


Fig. 7

Fig. 9

Fig. 11

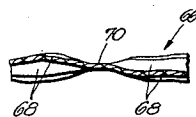
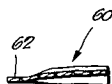
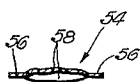


Fig. 8

Fig. 10

Fig. 12

INVENTOR.
CHARLES EUGENE NEISLER, JR.
BY *Edwin Leisohn*
ATTORNEY

March 24, 1953

C. E. NEISLER, JR

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FIG. 13

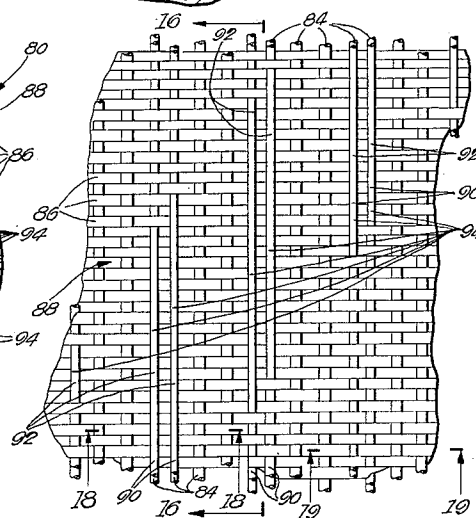
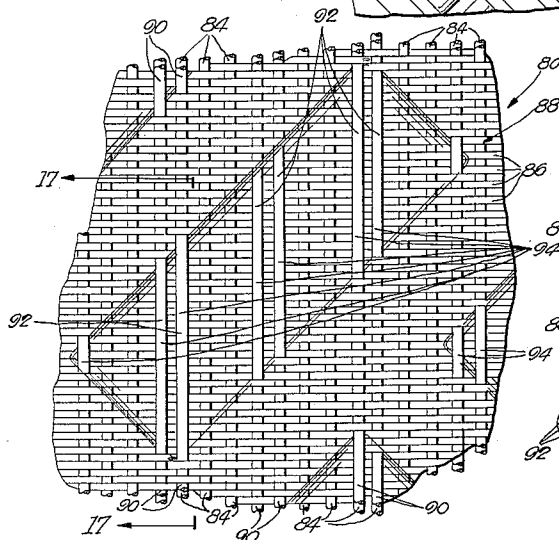
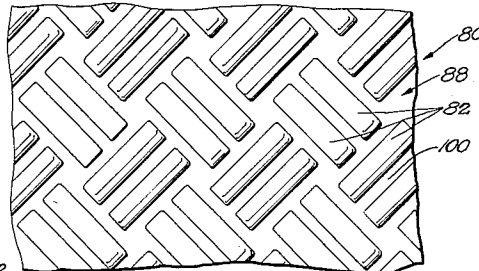


FIG. 15

FIG. 14

FIG. 20

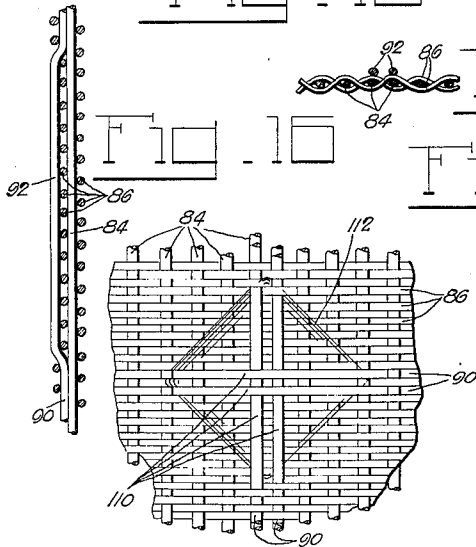
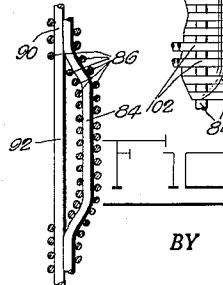


FIG. 18

FIG. 19



INVENTOR.
CHARLES EUGENE NEISLER, JR.

BY *Edwin Leisner*

ATTORNEY.

FIG. 21

UNITED STATES PATENT OFFICE

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TEXTILE FABRIC

Charles E. Neisler, Jr., Kings Mountain, N. C., as-
signor to Neisler Mills, Inc., Kings Mountain,
N. C., a corporation

Application January 6, 1949, Serial No. 69,480

21 Claims. (Cl. 28—76)

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This invention relates to textile fabrics, and more particularly to a woven fabric having puckered and non-puckered portions.

It is the primary aim and object of the present invention to provide a fabric of this type of which a portion or portions are puckered by certain yarns in the fabric which are shrunk relative to the other, non-shrinkable or less shrinkable yarns in the fabric, on merely subjecting the fabric to any finishing process in which the same becomes wet, without requiring stretching or any other special treatment of the woven fabric or of the yarns from which the fabric is woven.

It is another important object of the present invention to provide a fabric of this type in which the shrunk yarns are made of rayon, and the other yarns may be of any suitable kind that will not shrink, or shrink less than, the shrunk rayon yarns.

It is another object of the present invention to provide a fabric of this type which, without any pre-treatment of the yarns thereof, will after its one-time shrinkage shrink no more when washed or otherwise wetted.

It is another important object of the present invention to provide a fabric of this type, the one-time shrinkage of which is definite, predeterminable and permanent.

The above and other objects, features and advantages of the present invention will be more fully understood from the following description considered in connection with the accompanying illustrative drawings.

In the drawings:

Fig. 1 is a face view of a piece of fabric embodying the present invention;

Figs. 2 and 3 are sections taken on the lines 2—2 and 3—3, respectively, of Fig. 1;

Fig. 4 is a face view of another piece of fabric, embodying the present invention in a modified manner;

Figs. 5 and 6 are sections taken on the lines 5—5 and 6—6, respectively, of Fig. 4;

Fig. 7 is a face view of a piece of fabric embodying the present invention in a further modified manner;

Fig. 8 is a section taken on the line 8—8 of Fig. 7;

Fig. 9 is a face view of a piece of fabric embodying the present invention in a further modified manner;

Fig. 10 is a section taken on the line 10—10 of Fig. 9;

Fig. 11 is a face view of a piece of fabric embodying the present invention in a further modified manner;

Fig. 12 is a section taken on the line 12—12 of Fig. 11;

Fig. 13 is a face view of a piece of fabric

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embodying the present invention in still another modified manner;

Figs. 14 and 15 are greatly enlarged views of the back faces of the fabric shown in Fig. 13, prior and subsequent to its subjection, respectively, to a certain final operation in its manufacture;

Fig. 16 is a section taken on the line 16—16 of Fig. 14;

Fig. 17 is a section taken on the line 17—17 of Fig. 15;

Figs. 18 and 19 are sections taken on the lines 18—18 and 19—19, respectively, of Fig. 14; and Figs. 20 and 21 are greatly enlarged fragmentary views of the back faces of fabrics modified from that shown in Fig. 15.

To accomplish the aforesaid objects, I have made use of the discovery that direct-spun rayon yarn will, on becoming wetted once in non-stretched condition, permanently shrink a definite predeterminable amount, and thereafter shrink no more regardless of how often it may be re-wetted. In forming this rayon yarn by the spinning process, the continuous filaments from which the fibre staple is produced are ruptured by a tensioning process which involves the passage of a bundle of continuous rayon filaments between successive pairs of rolls of which the rolls of the front pair are driven at greater peripheral surface speed than the rolls of the rear pair so that the filaments are tensioned and ruptured into staple fibre due to the tension on the filaments in passing from the rear rolls to the front rolls. The fibres thus spun by the direct spinning process, involving the rupture of the continuous rayon filaments, are in attenuated condition in the yarn formed therefrom. In accordance with the present invention, direct-spun rayon yarns of this type are used for the threads to be shrunk in the fabric. The other yarns or threads in the fabric may be of any desired kind so long as they are non-shrinkable, or less shrinkable than the direct-spun rayon yarns.

Referring now to Fig. 1 of the patent drawings, there is shown, by way of example, a piece of fabric 30 in which smooth flat stripe-like portions 32 alternate with puckered stripe-like portions 34. In the present instance, the warp threads 36 within the confines of the smooth fabric portions 32 are direct-spun rayon yarns, while the remaining warp threads 38 within the confines of the puckered fabric portions 34 may be any suitable yarns that are non-shrinkable, or shrink less than the direct-spun rayon yarns 36. The weft threads 40 may be of any suitable, preferably non-shrinkable kind, and may, if desired, be the same as the warp threads 38. The warp threads 36, 38 and weft threads

40 are conventionally interwoven into the fabric 30.

The fabric thus woven comes off the loom in flat, non-puckered condition, since none of the threads 36, 38 and 40 have been tensioned in the manufacture of the fabric beyond the normal slight tension imparted to them while being interwoven in the loom. When the fabric becomes thereafter wetted in the course of any conventional finishing process, such as dyeing or bleaching, the direct-spun warp threads 36 will shrink relative to the other warp threads 38 in the fabric, resulting in a definite permanent warp-wise contraction of the fabric portions 32 in which the direct-spun threads 36 extend. Warp-wise contraction of the fabric portions 32 will result in puckering of the fabric portions 34 (Fig. 1) within the confines of which extend solely the substantially non-shrinkable threads 38 and 40. After being once wetted and permanently shrunk in consequence thereof, the fabric will shrink no more when subsequently washed or otherwise wetted. Thus, the originally smooth, flat fabric will, on becoming initially wetted, change its face pattern to that shown in Fig. 1, and will permanently hold this pattern regardless of how often the fabric is re-wetted.

As already mentioned, the final and permanent face pattern of the fabric may conveniently be imparted to it on its subjection to any conventional finishing process, in the course of which the fabric becomes wet, as in dyeing or bleaching, for instance. It is to be noted also that the threads in the fabric are not pre-treated in any way prior to their use in the loom, nor are they stretched while being interwoven in the loom. Further, the fabric coming from the loom requires, for the formation of its final and permanent face pattern, neither stretching nor tensioning nor any other treatment, other than mere wetting.

By way of example, a highly satisfactory fabric of the type shown in Fig. 1 has been obtained, by using for the shrinkable warp threads 36 direct-spun yarn 66 single cotton count made from one and one-half denier viscose rayon tow, and by using for the other warp threads 38 yarn of 900 denier 46 filament viscose rayon. While in the fabric just described the shrinkable direct-spun threads are arranged in the warp, they may obviously be arranged in the weft only, or in both, the warp and weft.

Fig. 4 shows a piece of fabric 50 in which the present invention is embodied in a manner to produce a crepe effect. Thus, in the manufacture of the fabric 50, the shrinkable direct-spun rayon threads 36' alternate, in the present instance in the warp, with non-shrinkable or less shrinkable yarns 38' of any suitable kind. The weft threads 40' may, as in the case of the fabric shown in Fig. 1, be of any suitable, preferably non-shrinkable kind. The fabric 50 comes off the loom in a smooth flat condition, and is thereafter subject to any conventional finishing process, such as dyeing or bleaching, in the course of which it becomes wet. When the fabric is thus wetted for the first time, the direct-spun threads 36' will contract (Figs. 4 and 6), resulting in longitudinal crinkling of the non-shrinkable or less shrinkable warp threads 38' (Figs. 4 and 5). It is the predominant appearance on either face of the fabric 50 of the crinkled threads 38' which lends to the fabric its crepe effect.

Reference is now had to Fig. 7 in which the present invention is embodied in a band 54, having smooth selvage edges 56 flanking a puckered, intermediate stripe-like portion 58. In the present instance, the shrinkable direct-spun yarns 33'' are arranged in the band 54 warp-wise within the confines of the selvage edges 56, while the remaining warp threads 38'' may be of any suitable non-shrinkable or less shrinkable kind. The weft threads in the band 54 may likewise be of any suitable, preferably non-shrinkable kind. The band 54 is, prior to its initial wetting, entirely flat, and its permanent face pattern, i. e., the smooth selvage edges 56 and the puckered intermediate portion 58, will emerge on the initial wetting of the band, as will not be understood. Fig. 8, like Fig. 7, shows the contract between the smooth selvage edges 56 and the puckered intermediate portion 58 of the band.

The present invention may also be applied for the formation of a ruffled band 60 (Figs. 9 and 10) having a smooth selvage edge 62. In this instance, the shrinkable direct-spun threads 36a are arranged in the band 60 warp-wise within the confines of the selvage edge 62. The remaining warp threads 38a may be of any suitable, substantially non-shrinkable kind. As in the case of the band 54, the instant band 60 is, prior to its initial wetting, flat throughout its surface area, and its permanent face pattern, i. e., the smooth selvage edge 62 and the ruffled remainder of the band, emerges on initially wetting the band.

Figs. 11 and 12 show a modified band 66 of which opposite ruffled margins 68 are joined by an intermediate smooth stripe-like portion 70. To this end, the shrinkable direct-spun threads 36b are arranged in the band 66 warp-wise within the confines of the intermediate band portion 70. The remaining warp threads 38b may be of any suitable, substantially non-shrinkable kind. The weft threads may also be of any suitable, preferably non-shrinkable kind. As in the case of the bands 54 and 60, the band 66 is, prior to its initial wetting, flat throughout its surface area, and its final and permanent face pattern emerges on initially wetting the band, as will now be readily understood.

Reference is now had to Figs. 13 to 18, showing a piece of textile fabric in which the present invention is embodied in a manner to produce a face pattern on the fabric which is different from those of the previously described fabrics. The instant fabric 80 has a face pattern which is characterized by a multitude of raised formations of any desired design on the adjacent face of the fabric. Thus Fig. 13 shows the fabric as having on its front face regularly arranged, raised rib-like formations 82. The instant fabric 80 is formed of conventionally interwoven warp and weft threads 84 and 86, respectively. The warp and weft threads 84 and 86 may be of any suitable, preferably substantially non-shrinkable kind. For convenience, the warp and weft threads 84 and 86 may be said to form the woven body 88 of the fabric.

Also interwoven with the body threads 84 and 86 are intermediate portions of additional, laterally spaced threads 90 which are direct-spun rayon yarns that are known for their definite and permanent shrinkage on being wetted for the first time. In the present instance, the additional threads 90 are indicated as warp threads. These additional threads 90 are so interwoven

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with the body threads 84 and 86 that they have intermittent floating portions 92 on the back of the fabric. In weaving the fabric 80, the additional threads 90 are tensioned no more and no less than the other threads 84 and 86, so that the floating portions 92 of the shrinkable threads 90 do not sag, but lie normally against the woven body 88 of the fabric in the manner shown in Fig. 16.

The floating portions 92 of the shrinkable threads 90 in the fabric are arranged in orderly groups 94 for the purpose of forming on the front face of the fabric the regularly arranged raised rib-like formations 82, respectively, on wetting the fabric for the first time. As in the previous examples, the instant fabric 80 may be wetted in the course of any conventional finishing process, such as dyeing or bleaching, for instance. When the fabric 80 is thus wetted, the additional threads 90 thereof will shrink. The body 88 of the fabric will not bulge where the shrunk threads 90 are interwoven with the body threads 84 and 86. However, the floating portions 92 of the shrunk threads 90, being unconnected with those portions of the body 88 of the fabric which they bridge in the manner shown in Figs. 14 and 16, will cause these body portions to rise above the front face 100 of the fabric in the manner shown in Fig. 17. The effect of the shrinkage of the threads 90 upon the fabric is also apparent from a comparison between Figs. 14 and 15, Fig. 14 showing the fabric before shrinkage and Fig. 15 showing the same after shrinkage. The numerous groups 94 of floating thread portions 92 on the back of the fabric will, on wetting the fabric for the first time, raise the fabric portions adjacent the floating thread groups 94 into the raised rib-like formations 82 on the front face 100 of the fabric (Fig. 13). Hence, the coordination of the floating thread portions 92 in each group, and the distribution of the floating thread groups 94 on the back of the fabric, will determine the raised pattern on the front face of the fabric.

While in the fabric just described, the additional shrinkable threads 90 are incorporated in the fabric as warp threads, they may instead be incorporated in the fabric as weft threads (Fig. 20) having floating portions 102 on the back of the fabric which are arranged in groups 104 to form on the face of the woven fabric, on wetting the latter, raised formations of the general shape indicated at 106, for instance.

The shrinkable threads 90 may further be interwoven with the body threads 84 and 86, both as warp and weft threads in the manner illustrated in Fig. 21, in which the floating portions 110 of the shrinkable threads 90 intersect each other to form, on wetting the woven fabric, a raised substantially quadrilateral formation 112 on the front face of the fabric.

The instant application is a continuation in part of my co-pending application Serial No. 698,239, filed September 20, 1946.

While I have shown and described the preferred embodiments of my invention, it will be understood that various changes may be made in the present invention without departing from the underlying idea or principles of the invention within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A woven pre-shrunk textile fabric, comprising warp-and-weft interwoven, substantially non-shrunk puckered threads and shrunk threads formed from attenuated spun rayon, of which the

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shrunk threads hold the adjacent other threads puckered.

2. A woven pre-shrunk textile fabric, comprising threads interwoven in the warp and weft directions, said threads being substantially non-shrunk first threads extending in both directions and shrunk threads formed from attenuated spun rayon and extending parallel to said first threads in one of said directions, the first threads which extend in one of said directions being puckered by the shrunk threads.

3. A woven pre-shrunk textile fabric, comprising threads interwoven in the warp and weft directions, said threads being substantially non-shrunk first threads solely used in one of said directions and used in a first group in the other direction, and shrunk threads formed from attenuated spun rayon and used only in said other direction in groups parallel to and flanking said first thread group, the threads in said first group being puckered, the shrunk threads holding said first threads puckered within the confines of said first thread group.

4. A woven pre-shrunk textile fabric, comprising threads interwoven in the warp and weft directions, said threads being substantially non-shrunk first threads solely used in one of said directions and used in spaced first groups in the other directions, and shrunk threads formed from attenuated spun rayon used only in said other direction in second groups parallel to and alternating with said first thread groups, the threads in said first group being in puckered condition, the shrunk threads in said second groups holding said first threads puckered within the confines of said first thread groups.

5. A woven pre-shrunk textile fabric, comprising threads interwoven in the warp and weft directions, said threads being substantially non-shrunk first threads solely used in one of said directions and partly used in the other direction, and shrunk threads formed from attenuated spun rayon and used only in said other direction in single alternation with said first threads, the first threads which extend in said other direction being puckered by said shrunk threads and lending to the fabric a crepe effect.

6. A woven pre-shrunk ruffle band, comprising threads interwoven in the warp and weft directions, said threads being substantially non-shrunk first threads solely used in one of said directions and used in a first single group in the other direction, and shrunk threads formed from attenuated spun rayon and used only in said other direction in a second group parallel to and flanking said first thread group, the band portion formed by threads in said first group being ruffled, the shrunk threads in said second group holding in ruffled condition said band portion formed by said first threads within the confines of said first thread group.

7. A woven pre-shrunk textile fabric having raised portions and comprising in its body of interwoven warp and weft threads floating portions of shrunk threads formed from attenuated spun rayon, of which the shrunk floating thread portions hold adjacent portions of the fabric raised above the ground of the fabric for providing the fabric with said raised portions.

8. A woven pre-shrunk textile fabric having raised portions and having on the back of its body of interwoven warp and weft threads floating portions of shrunk threads formed from attenuated spun rayon, of which the shrunk floating thread portions hold adjacent portions of the

fabric raised above the ground of the fabric for providing said raised portions on the face thereof.

9. A woven pre-shrunk textile fabric having raised portions and having in its body of interwoven warp and weft threads floating portions of shrunk threads formed from attenuated spun rayon and arranged in an orderly fashion on one side of the fabric, so that the shrunk floating thread portions hold adjacent portions of the fabric raised above the ground of the fabric and thereby provide said raised portions on the other side thereof in the form of a regular pattern.

10. As a step product, woven textile fabric having in its body interwoven, substantially non-shrinkable threads and shrinkable threads formed from attenuated rayon staple fibre, the shrinkable threads having floating portions which, when shrunk in the fabric, raise adjacent portions of the fabric above the ground of the latter to produce a fabric which, in its finished state, is provided with raised surface portions.

11. A woven pre-shrunk textile fabric having raised portions and having first regularly interwoven, substantially non-shrunk warp and weft threads to form the body of the fabric, and shrunk threads formed of attenuated rayon staple fibre and having intermittent portions interwoven with said first threads, whereby portions of the fabric are raised above the ground of the fabric by the shrunk, non-interwoven portions of said additional threads and thereby form said raised portions.

12. A woven pre-shrunk textile fabric having raised portions and having in its body of interwoven warp and weft threads intersecting floating portions of shrunk threads formed from attenuated rayon staple fibre, of which the contracted intersecting floating thread portions hold adjacent portions of the fabric raised above the ground of the fabric and thereby provide said raised portions.

13. As a step product, woven textile fabric having substantially non-shrinkable threads and shrinkable threads spun from attenuated rayon staple fibre, the shrinkable threads having intersecting floating portions which, when shrunk in the fabric, hold adjacent portions of the fabric raised above the ground of the fabric to produce a fabric which, in its finished state, is provided with raised surface portions.

14. A woven fabric having raised surface portions, said fabric comprising therein interwoven, differentially shrinkable textile threads, the threads of greater shrinkability being formed from attenuated spun rayon fibres and having portions floating over interwoven threads of the fabric.

15. Method of producing a textile fabric for further treatment to provide it with puckered portions, comprising interweaving in the warp and weft directions substantially non-shrinkable first threads and shrinkable threads spun from attenuated rayon staple fibre, so that only said first threads extend in one of said directions and form also part of the threads extending in the other direction, and said shrinkable threads form the remainder of the threads extending in said other direction.

16. Method of producing a textile fabric having puckered portions, comprising the steps of interweaving in the warp and weft directions substantially non-shrinkable first threads and shrinkable threads spun from attenuated rayon staple fibre, so that only said first threads extend in one of said directions and form also part of the threads

extending in the other direction, and said shrinkable threads form the remainder of the threads extending in said other direction, and wetting the woven fabric.

17. Method of producing a textile fabric having portions raised above the ground thereof, comprising the steps of interweaving substantially non-shrinkable threads and shrinkable threads spun from attenuated rayon staple fibre so that portions of said shrinkable threads are floating on the fabric, and wetting the fabric, whereby the shrinking floating thread portions permanently raise adjacent portions of the fabric above the ground of the latter.

18. Method of producing a textile fabric with a regular raised pattern on the face thereof, comprising the steps of interweaving substantially non-shrinkable threads and shrinkable threads spun from attenuated rayon staple fibre so that portions of said shrinkable threads are floating on the back of the fabric in an orderly fashion, and wetting the fabric, whereby the shrinking floating thread portions permanently raise adjacent portions of the fabric above the ground of the fabric on the face thereof into a regular pattern.

19. The method of providing a woven fabric with surface portions thereof raised above the ground of the fabric, comprising forming a first fabric having interwoven, differentially shrinkable and substantially non-shrinkable textile threads, the shrinkable threads being spun from attenuated rayon staple and having portions which are floated over interwoven threads of the fabric, and subjecting said first fabric to the action of an agent for shrinking said floated-over portions of said shrinkable threads.

20. A method of forming a woven pre-shrunk textile fabric having a puckered effect which comprises interweaving groups of warps and wefts, one of said groups comprising non-shrinkable yarns and shrinkable direct spun rayon yarns formed of attenuated ruptured filaments, wetting the fabric and drying it while maintaining it in a relaxed condition, thereby contracting the shrinkable yarn and puckering the non-shrinkable yarn.

21. A woven pre-shrunk textile fabric having a puckered effect, said fabric comprising substantially parallel yarns, some of said yarns being non-shrunk and in puckered condition, and others of said yarns being direct spun from attenuated, ruptured rayon filaments, said latter yarns being shrunk whereby to hold said non-shrunk yarns puckered.

C. E. NEISLER, JR.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,883,384	Lohrke	Oct. 18, 1932
2,022,391	Smith	Nov. 26, 1935
2,067,816	Barnick	Jan. 12, 1937
2,077,078	Taylor et al.	Apr. 13, 1937
2,077,079	Taylor et al.	Apr. 13, 1937
2,171,626	Dreyfus	Sept. 5, 1939
2,184,751	Nathanson et al.	Dec. 26, 1939
2,218,633	Bell et al.	Oct. 22, 1940
2,231,388	Kahil	Feb. 11, 1941
2,277,782	Rugeley	Mar. 31, 1942
2,373,194	Luttge	Apr. 10, 1945
2,401,829	Kahil	June 11, 1946