

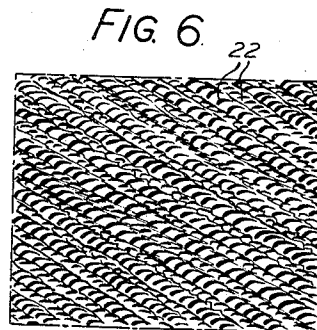
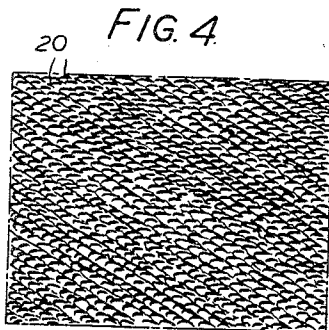
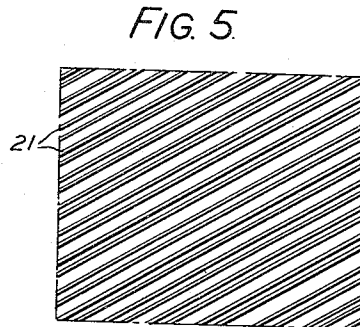
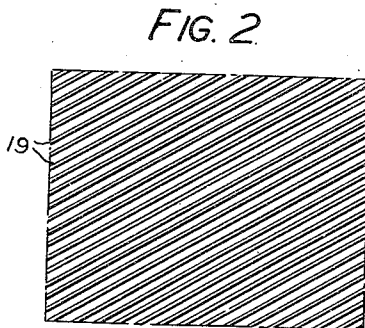
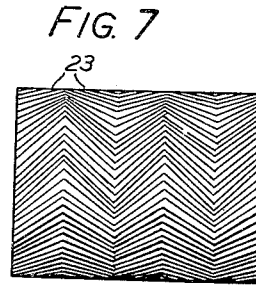
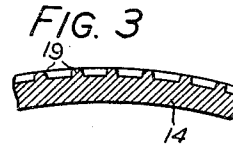
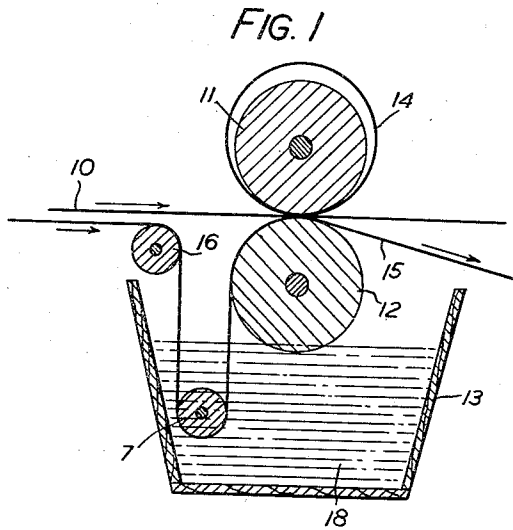
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TREATMENT OF TEXTILE MATERIALS

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TREATMENT OF TEXTILE MATERIALS

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This invention relates to the treatment of textile materials and is particularly concerned with the production of woven fabrics exhibiting crepe effects.

5 Crepe effects are produced by employing in the weaving of a fabric yarns containing a high degree of twist, say 60–80 turns per inch, such yarns generally being employed in the weft, or in both warp and weft. After weaving, the fabric is submitted to a scouring or other wet treatment which causes the fabric to shrink and cockle, thus distorting the surface of the fabric to produce the crepe effect. The effect produced (the "figure") may be of fine or coarse grain, according to the fineness or coarseness and degree of twist of the yarns, the closeness with which they are woven, and other conditions obtaining.

According to the present invention a crepe fabric is embossed, prior to scouring or other treatment adapted to develop the crepe effect, with a close pattern of lines. When the fabric is subsequently submitted to scouring or equivalent treatment, the crepe effect due to the high degree of twist in the crepe yarns which the fabric contains is brought out. As a result of the embossing, however, the crepe effect, instead of appearing at random over the whole face of the fabric, is predisposed to follow the pattern of the lines embossed, and in consequence a controlled crepe effect forming a distinct pattern of closely spaced lines is produced.

The pattern may for example comprise a number of closely spaced parallel lines, preferably running obliquely across the face of the fabric. Such lines may all be equally spaced or they may be arranged in pairs or in other ways, and they may be of constant or varying pitch. On the other hand, the pattern may comprise for example two mutually inclined and intersecting sets of parallel lines, or different areas on the fabric may be embossed with parallel lines in different directions. Moreover, a further variety of effects may be obtained by embossing the pattern or patterns of lines over certain areas only of the fabric, leaving the remaining areas unembossed; in such cases the embossed areas may be of any desired shape; for instance they may be rectangular or circular or of any other regular or irregular shape. Such areas may all be embossed with the same pattern or different areas may be embossed with different patterns. The unembossed areas may if desired be treated, for example by heat and pressure, to hinder or prevent them from taking up a crepe figure during the scouring operation, or they may be allowed to take up a crepe figure in

the usual way. When certain areas are embossed as above described, the remainder of the fabric may if desired also be embossed with a different pattern of lines.

While the grain or pebble of the crepe figure is largely controllable by the spacing between the lines, valuable results may be obtained by embossing the fabric with a pattern consisting of parallel lines, in which the spacing of the lines approximates to the length of the grain or pebble which would naturally appear on shrinkage of that particular fabric if it were scoured without being embossed, the spacing depending not only upon the fineness or otherwise of the fabric but also upon the angle at which the embossed lines cross the fabric. For example, if the spacing between picks is of the order of $\frac{1}{60}$ " and the embossed lines run parallel to one another at 45° across the face of the fabric, the pitch of the embossed lines may be of the order of $\frac{1}{32}$ ". When the fabric is shrunk it creases slightly along the embossed lines, so that the highly twisted yarns in the fabric cockle between the lines and produce a controlled and patterned crepe effect.

Variations in the precise effect obtained may also be produced by varying the degree of deformation of the fabric in the embossing operation. Thus for example the fabric may be given a permanent pattern in the embossing operation quite apart from the crepe pattern which is developed when the embossed fabric is scoured. Alternatively the deformation of the fabric produced by embossing alone may be only temporary in nature and degree, and may serve simply to control the incidence of the crepe figure; indeed it may be so slight as to be visible only with difficulty before the scouring operation. It will be understood that even when the deformation of the fabric due to the embossing operation is only temporary in nature, a permanent pattern is produced in the scouring step owing to the shrinkage and cockling of the crepe threads, controlled and directed by the temporary deformation induced by the embossing step.

The fabric may be embossed in a plate press, in which a flat engraved plate is employed, pressing the fabric on to a soft cotton bed. More conveniently, however, a suitably engraved embossing bowl may be employed, the fabric being passed between the embossing bowl and a yielding bowl, or between an embossing bowl and a blanket which in turn is pressed against a yielding bowl. For example, to produce an oblique parallel line pattern having a pitch of $\frac{1}{32}$ ", the embossing surface may be engraved with ribs $\frac{1}{16}$ " wide and

approximately $\frac{1}{16}$ " high. It is desirable that the bowl or other pressing surface should be heated, and also that the fabric should be damped or wetted before embossing. Damping or wetting, however, should be delayed until the last moment before embossing in order that the crepe effect may not appear prematurely on the fabric. Instead of or as well as being damped, the fabric may be treated with softening agents such as glycerol, glycol, diethylene glycol and their derivatives and/or weakly polar agents such as dibutyl tartrate, dibutyl phthalate, etc.

Other methods of embossing may be employed. For example the fabric may be passed between two hard bowls, one of which is engraved and intermeshes with the other, which is raised in intaglio. A device of this kind must, however, be used with caution to prevent the fabric being weakened unduly. In another method a blanket such for example as cotton duck or terry may be used as the embossing means, being passed with the fabric to be treated between smooth bowls; alternatively the fabric may be passed between smooth bowls between an "embossing" fabric such as an open weave cotton blanket and a fine textured blanket which acts as a backing. When a fabric is employed as the embossing means it may be furnished with a controlled amount of a softening agent such as diethylene glycol, and/or it may be damped or wetted before entering the nip.

If desired, two or more fabrics may be embossed simultaneously. For example, two layers of fabric, with a blanket of fine texture between them, may be passed between two embossing bowls, which may carry the same or different designs.

The process of the invention may be applied to any type of fabric containing crepe or high twist yarns, but it is of especial value when applied to fabrics consisting of or containing organic derivatives of cellulose, e. g. cellulose esters such as cellulose acetate, propionate and butyrate, cellulose ethers such as methyl, ethyl and benzyl cellulose, and ether-esters of cellulose such as ethyl cellulose acetate, etc. When fabrics containing cellulose esters are being treated the embossing operation may be combined with a saponifying step, thus making possible pleasing dyeing effects. For example, the raised portions of an embossing roll may be wetted with, for example, a 10, 20 or 30% solution of sodium hydroxide, for instance by contact with a furnishing roll.

One method in which the invention may be carried into effect, and examples of fabrics produced according to the invention, are illustrated in the drawing, in which

Fig. 1 illustrates diagrammatically a device for embossing the fabrics;

Fig. 2 is a plan view of part of the surface of an embossing shell;

Fig. 3 is a sectional view of part of the same embossing shell;

Fig. 4 represents a fabric produced by embossing with the shell of Fig. 2 and afterwards scouring;

Fig. 5 is a plan view of part of the surface of another embossing shell;

Fig. 6 represents a fabric produced by embossing with the shell of Fig. 5 and afterwards scouring;

Fig. 7 is a plan view of an embossing shell with a different type of line pattern.

Referring to Fig. 1, a woven crepe fabric 10

in the grey state is passed, before scouring or other shrinking treatment, between rubber mangle bowls 11 and 12, positioned over a vat 13. The upper bowl 11 is provided with a metal shell 14 of larger diameter than the bowl, the surface of the shell 14 being engraved with the line pattern it is desired to impart to the fabric. The shell 14 is heated by any suitable means (not shown). As a backing for the fabric there is provided a blanket 15 passing over the guide roller 16, under the tensioning roller 17 and between the rubber bowls 11 and 12. The vat 13 contains hot water which is taken up by the blanket 15 and thus applied to the fabric 10 immediately before it is embossed.

Examples of embossing surfaces are shown in Figs. 2 and 3, Fig. 5 and Fig. 7 respectively. The pattern shown in Figs. 2 and 3 consists of equidistant obliquely arranged parallel ridges 18; fabric embossed by this surface and subsequently scoured to bring out the crepe figure is shown in Fig. 4, the pebbles 20 being aligned between the lines on the fabric corresponding to the ridges 18. In the surface shown in Fig. 5 ridges 21 are arranged in pairs, with the consequence that in the corresponding fabric, shown in Fig. 6, the crepe figure takes the form of alternate lines of long and short pebbles 22.

Fig. 7 shows a composite embossing shell, capable of producing shadow stripe effects and made by engraving two shells with multi-start threads of opposite hands, cutting the shells into rings 23, and assembling the rings again on a mandrel to form a composite bowl in which the thread is alternately right hand and left hand.

The embossing device described above may be modified by the use of an endless blanket or by employing a blanket sleeve on the lower bowl. Again, an endless blanket may be employed to run around the bottom bowl, suitable guide means being provided to conduct the blanket to and from the nip of the bowls.

What we claim and desire to secure by Letters Patent is:—

1. Process for the production of fabrics exhibiting crepe effects, which comprises embossing a fabric containing crepe threads with a close pattern of lines, the thickness of such lines being less than the natural length of the crepe pebble, and subsequently subjecting the fabric to a scouring or other shrinking treatment, whereby the location of the crepe pebbles between the lines is secured without suppression of pebble formation in any part of the fabric subjected to the said embossing treatment.

2. Process for the production of fabrics exhibiting crepe effects, which comprises embossing a fabric containing crepe threads with a close pattern of parallel straight lines which are spaced at a distance approximating to the natural length of the crepe pebble and which have a thickness less than the natural length of the crepe pebble, and subsequently subjecting the fabric to a scouring or other shrinking treatment, whereby the location of the crepe pebbles between the lines is secured without suppression of pebble formation in any part of the fabric subjected to the said embossing treatment.

3. Process for the production of fabrics exhibiting crepe effects, which comprises embossing a fabric containing crepe threads with a close pattern of parallel straight lines which run obliquely across the face of the fabric and which have a thickness less than the natural length of the crepe pebble, and subsequently subjecting the fabric

to a scouring or other shrinking treatment, whereby the location of the crepe pebbles between the lines is secured without suppression of pebble formation in any part of the fabric subjected to the said embossing treatment.

4. Process for the production of fabrics exhibiting crepe effects, which comprises embossing a fabric containing crepe threads with a close pattern of parallel straight lines which run obliquely across the face of the fabric, which are spaced at a distance approximating to the natural length of the crepe pebble and which have a thickness less than the natural length of the crepe pebble, and subsequently subjecting the fabric to a scouring or other shrinking treatment, whereby the location of the crepe pebbles between the lines is secured without suppression of pebble formation in any part of the fabric subjected to the said embossing treatment.

5. Process for the production of fabrics exhibiting crepe effects, which comprises embossing a fabric containing crepe threads with a close pattern of intersecting sets of parallel straight lines which run obliquely across the face of the fabric and which have a thickness less than the natural length of the crepe pebble, and subsequently subjecting the fabric to a scouring or other shrinking treatment, whereby the location of the crepe pebbles between the lines is secured without suppression of pebble formation in any part of the fabric subjected to the said embossing treatment.

6. Process for the production of fabrics exhibiting crepe effects, which comprises embossing a fabric containing crepe threads with a close pattern of intersecting sets of parallel straight lines which run obliquely across the face of the fabric, which are spaced at a distance approximating to the natural length of the pebble and which have a thickness less than the natural length of the pebble, and subsequently subjecting the fabric to a scouring or other shrinking treatment, whereby the location of the crepe pebbles between the lines is secured without suppression of pebble formation in any part of the fabric subjected to the said embossing treatment.

7. Process for the production of fabrics exhibiting crepe effects, which comprises embossing part only of a fabric containing crepe threads with a close pattern of parallel straight lines which have a thickness less than the natural length of the

crepe pebble, and subsequently subjecting the fabric to a scouring or other shrinking treatment, whereby the location of the crepe pebbles between the lines is secured without suppression of pebble formation in any part of the fabric subjected to the said embossing treatment.

8. Process for the production of fabrics exhibiting crepe effects, which comprises embossing different parts of a fabric containing crepe threads with different patterns of closely spaced parallel straight lines which have a thickness less than the natural length of the crepe pebble, and subsequently subjecting the fabric to a scouring or other shrinking treatment, whereby the location of the crepe pebbles between the lines is secured without suppression of pebble formation in any part of the fabric subjected to the said embossing treatment.

9. Process for the production of fabrics exhibiting crepe effects, which comprises embossing alternate strips of a fabric with similar patterns of closely spaced parallel straight lines which run obliquely across the fabric, the inclination of the lines in any strip being opposed to that in each adjacent strip and the thickness of such lines being less than the natural length of the crepe pebble, and subsequently subjecting the fabric to a scouring or other shrinking treatment, whereby the location of the crepe pebbles between the lines is secured without suppression of pebble formation in any part of the fabric subjected to the said embossing treatment.

10. Process for the production of fabrics exhibiting crepe effects, which comprises embossing alternate strips of a fabric with similar patterns of parallel straight lines which run obliquely across the fabric, which are spaced at a distance approximating to the natural length of the pebble and which have a thickness less than the natural length of the pebble, the inclination of the lines in any strip being opposed to that in each adjacent strip, and subsequently subjecting the fabric to a scouring or other shrinking treatment, whereby the location of the crepe pebbles between the lines is secured without suppression of pebble formation in any part of the fabric subjected to the said embossing treatment.

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