

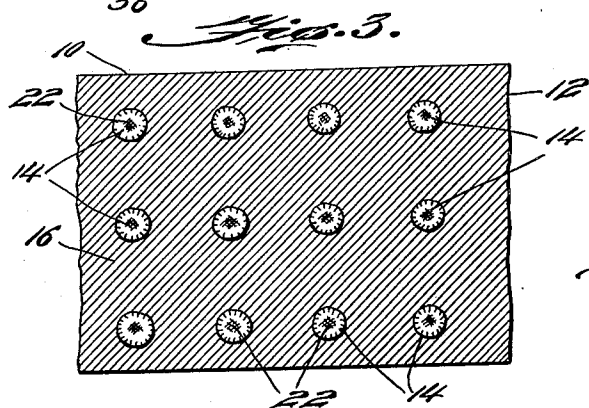
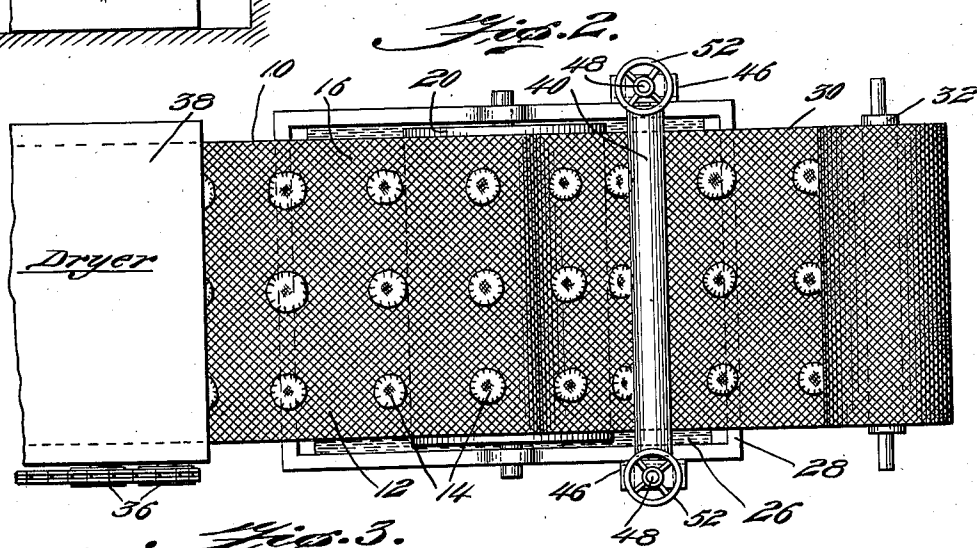
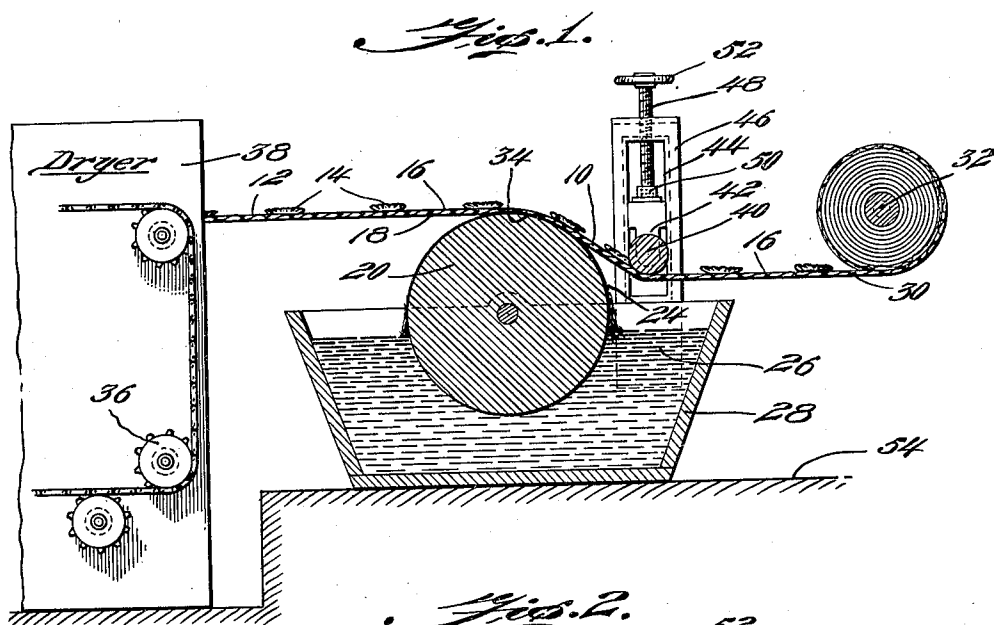
Aug. 30, 1938.

C. T. GRAHAM

2,128,516

METHOD OF TREATING FABRICS

Original Filed Feb. 2, 1935



Inventor
Clarence T. Graham,
By Thomas A. Jencks
Attorney

UNITED STATES PATENT OFFICE

2,128,516

METHOD OF TREATING FABRICS

Clarence T. Graham, Mansfield, Mass., assignor
to William H. Bannon, Mansfield, Mass.

Application February 2, 1935, Serial No. 4,643
Renewed June 7, 1938

2 Claims. (Cl. 8—151)

My invention relates to a novel type of fabric, preferably one having uniformly dyed or finished ground threads and raised pattern-forming or figure portions on the face of said ground threads, said raised pattern-forming or figure portions being undyed or unfinished or differently dyed or finished from said uniformly dyed or finished ground threads, and an improved method and apparatus for its manufacture.

My invention is particularly adapted for use in making the now popular fabric having uniformly dyed or finished ground threads and roving dots simultaneously woven with and on the face of said ground threads, sheared and undyed or unfinished or differently dyed or finished from said simultaneously woven ground threads.

Heretofore in finishing, dyeing or printing fabrics of the above type, it has been difficult or impossible to prevent any finish or color applied to the background from penetrating the raised figure or pattern, resulting in more or less uniformity or sameness in color or finish in both the background and the raised figure portions.

Employing my improved process, I take a cloth preferably woven with a background and having raised figure or pattern portions on the face, preferably woven simultaneously with said background and prepared in any of the usual manners for dyeing or finishing, such as by bleaching, mercerizing, washing, drying, dyeing, etc., the entire fabric. This results in giving the desired finish to the raised portions. The prepared fabric is then passed, figure side upwards, over a roller or similar device, the peripheral surface of which is covered with a film of a dyeing or finishing liquid in such a manner that only the background of the fabric contacts and absorbs the finish or color from the roller. Then, before the finish or color can penetrate the raised figure or pattern on the face of the fabric, it is quickly dried without permitting the face side of the fabric to touch any contaminated surface. If desired, the time duration of contact of the surface of the fabric with the roller and the initiation of the drying may be varied to affect the degree of penetration of the finish or dye into the raised portions and, if desired, to permit a partial penetration to the raised portions to partially finish or dye them in a different manner from the finish or dye applied to the background.

Further objects of my invention therefore are to vary the degree of penetration into said raised portions by selecting the fabric threads relative to their absorbing qualities in the preparation of the fabric, the concentration and the nature of

the liquid dyeing or finishing materials applied, the arc of contact of the fabric upon the applying roller, the speed of the fabric passing over the roller, and by correctly timing or varying the time interval between the period of contact of the fabric with the roller surface and the subsequent initiation of drying the fabric after contact with the roller.

Further features of my invention relate to an improved type of apparatus I may employ for this purpose, including a roller, means to rotate said roller, means to apply a film of liquid dyeing or finishing material to the surface of said roller and means adjustably mounted adjacent said roller to abut the face of said fabric in front of said roller to vary the arc of peripheral contact thereof therewith and hence the time duration of said peripheral contact.

I also preferably provide said improved apparatus with drying means located the desired amount behind said roller to receive said fabric in sheet form from said roller, and I preferably loosely mount said roller on or adjacent a tank for holding the liquid dyeing or finishing material, preferably so as to have a portion of the periphery thereof immersed in said liquid material to supply on rotation thereof a film of said liquid material on the periphery of said roller to apply to the reverse of said fabric on peripheral contact therewith.

I also provide means to feed the fabric in sheet form to bring the reverse thereof in peripheral contact with said roller, and I preferably drive said roller by the frictional contact of the reverse of said fabric thereby to rotate said roller to pick up said film of liquid material from the liquid dyeing or finishing material contained in said tank. I may thus, by providing means to vary the speed of the drying means driving means, vary the speed of said fabric over said roller. In order to provide a device wherein the time interval between the line or arc of peripheral contact of the fabric and the roller and the portion of drying initiation of said drying means may be varied, I preferably provide an apparatus wherein the tank is movable relative to the portion of drying initiation of said drying means to additionally regulate the amount of said liquid material impregnated on the reverse of the fabric.

These and such other objects of my invention as may hereinafter appear will be best understood from a description of the accompanying drawing which illustrates an embodiment of my improved fabric and a suitable apparatus for its manufacture.

In the drawing:

Figure 1 is a diagrammatic elevational view partially shown in section of a suitable type of apparatus for carrying out my improved method for manufacturing my improved novel fabric;

Figure 2 is a plan view of the apparatus shown in Figure 1;

Figure 3 is a plan view of my improved type of fabric.

In the drawing, wherein like characters of reference indicate like parts throughout, 10 generally indicates an improved type of fabric constructed in accordance with my invention. Said fabric includes the ground 12 and the raised pattern-forming or figure portions 14 on the face thereof. While any type of fabric 10 having the ground 12 and raised pattern-forming or figure portions 14 may be employed, whether laced, braided, woven, or otherwise, I preferably employ a woven fabric 10 woven from the usual warp and filling threads and with the raised pattern-forming or figure portions formed by the additional pattern-forming or figure threads on the face thereof usually woven, twisted, braided, or otherwise formed simultaneously therewith. The pattern-forming threads may be interwoven at desired intervals with the ground threads and the portions between said interwoven portions sheared or otherwise removed as is common in fabrics of this description to form the raised pattern-forming or figure portions 14 on the face thereof. The entire ground 12, including the interwoven warp and filling threads where woven, is preferably piece dyed or piece finished in my novel manner to have the ground threads thereof uniformly dyed or finished without substantially affecting or differently affecting said raised pattern-forming or figure portions.

I have shown as my improved embodiment of fabric, a fabric of the roving dot type wherein the dots are suitably bleached, mercerized and dried initially with the ground of the fabric in a piece bleaching, piece mercerizing, piece dyeing and/or piece drying operation, and in my preferred embodiment are preferably finished so as to bring out the natural fluffiness in the dots 14.

Woven cloth having the raised figure or pattern forming portions 14 on the face 16 thereof is prepared in any of the usual manners for dyeing or finishing, such as by bleaching, mercerizing, tinting, washing and/or drying the entire fabric including the ground 12 and the raised figure or pattern portions 14 to give the desired finish to said raised portions if they are to be unaffected in my improved process. If desired, however, particularly if the pattern forming portions are to be partially finished or dyed, the fabric may be treated by my improved method in the gray state. The gray or prepared fabric, according to my improved method, is then passed with the face 16 upwards over a roller 20 to bring the reverse 18 thereof into peripheral contact with the roller or similar rotating device 20, the peripheral surface of which is covered with a solution of a color or finish or both in such a manner that the reverse of the fabric contacts and absorbs the finish or color on the roller, permitting the finish or color to only penetrate the background without any substantial penetration into the raised pattern-forming or figure portions or with a different degree of penetration thereof from the penetration thereof in the background, and then before the finish or color can be absorbed by the raised figure or pattern portion on the face of the fabric at all or in a limited pre-

determined degree, quickly drying the fabric preferably without permitting the face of the fabric to touch any contaminated surfaces. The depth of the penetration of the liquid or finishing material into the thicker or raised pattern-forming or figure portions on the face of the fabric may be affected by (1) regulating the selection of the materials of said fabric relative to their absorbing qualities, (2) varying the concentration and nature of the finishing or dyeing materials applied, (3) varying the time duration of contact of said liquid material with the reverse of the fabric, and, (4) varying the time duration between the line or arc of contact of said material with said reverse of said fabric and the initiation of the drying of the fabric. If the fabric is dried substantially immediately, it is apparent that there will be no substantial penetration of the raised pattern-forming or figure portions 14 on the face. If not dried quite so soon, said dyeing or finishing materials may penetrate the portions immediately adjacent the ground to produce the daisy effect shown in Figure 3, wherein the central portions 22 of the dots 14 are slightly dyed, thus producing a partial dyeing or finishing of portions or all of the raised pattern-forming or figure portions on the face of the fabric. If desired, a colored background of a different shade than the previously colored raised pattern or figure on the face may be provided or one in which the depth of shades thereof may be varied. It may produce a stiffened background, leaving the raised figure or pattern on the face soft. It may produce color and stiffness in the background with the figure on the face uncolored and soft or differently predyed or prefinished, or differently simultaneously dyed or finished. It will permit the application of mordants, lustering or delustering agents or any other textile finishing agent to the ground, leaving the raised figure or pattern on the face unaffected or affected in a lesser degree to produce a different effect.

In the preferred embodiment shown, I rotate a roller 20 by any suitable means, apply a film 24 of liquid finishing or dyeing material to the periphery of the roller 20, preferably by rotating a roller 20 immersed in liquid dyeing or finishing material 26 contained in a suitable tank 28 to draw on the rotation thereof a film 24 of said liquid dyeing or finishing material 26 from said tank 28. The gray fabric 30 or fabric 30 previously treated all over to provide a desired finish to the raised figure or pattern-forming portions 14 thereof is drawn in sheet form from a source of sheet form supply such as the roller 32 over the surface 34 of said roller 20 to feed said film of liquid material 24 on the reverse 18 of said fabric by peripheral line or arc contact of the periphery of said roller 20 with the reverse 18 of said fabric. The fabric 10 may be drawn in continuous form over said roller 20 in peripheral contact therewith in any suitable manner, such as by the driving means 36 of a suitable drying means 38, which functions not only to draw the fabric 10 over said roller 20 but to rotate the roller 20 by peripheral contact of the fabric therewith to rotate said roller to cause it to receive the film 24 of liquid dyeing or finishing material on the periphery thereof and applying it as at 34 to the reverse 18 of said continuous sheet of fabric 10.

While any suitable type of apparatus may be employed for carrying out my improved process, I have shown a novel type of apparatus for this purpose, including in subcombination a roller 20, 7

means to rotate said roller 20, and means for applying a film 24 of liquid dyeing or finishing material to the rotating peripheral surface of said roller 20. I provide means such as a cloth 5 roll 32 to feed fabric in sheet form to bring the reverse 18 thereof into peripheral contact with said roller, and as the roller is rotated, in any suitable manner, to apply the film 24 to the reverse of said moving fabric. I also provide in 10 combination therewith means adjustably mounted adjacent said roller to abut the face 16 of said fabric in front of said roller 20 to vary the arc 34 of peripheral contact thereof therewith and hence the time duration of said peripheral 15 contact.

I preferably, however, provide a device hitherto described in combination with a suitable drying means 38, preferably including means 36 to grip the fabric to drive it therethrough to form a positive drive for the fabric from said source 20 of supply 32 into peripheral contact with said roller 20 as at 34. I obtain best results by loosely mounting said roller 20 adjacent or on said tank 28 to permit peripheral contact of the fabric 25 with the roller 20 to rotate said roller to draw the film 24 from the liquid 26 to apply it on the reverse 18 of the fabric. It is obvious, however, that if desired, a uniform or substantially uniform film or supply of liquid may be applied to 30 the reverse of the fabric in any suitable manner, such as by painting, spraying, or otherwise, but I have obtained best results by first applying the film to the peripheral surface of a rotatable roller 20 and evenly transferring said film 24 from said 35 surface 20 onto the reverse 18 of said fabric. While the film 24 may be applied to the surface of said roller in any suitable manner as by spraying, dipping, or otherwise, I have attained best results by immersing the lower portion of the 40 roller in the dyeing or finishing liquid 26 contained within the tank 28 and by rotating the roller 20 by the peripheral contact of the fabric passing thereover. With the drying means driving means 36 pulling the fabric over the roller 20 from 45 the source of supply 32, it is apparent that the speed of the driving means 36 will automatically regulate the speed of the roller 20 and it will not be necessary to synchronize two different speeds to prevent piling up or thinness of the film in spots 50 were the roller 20 separately driven. The drier 38 may comprise drying means of the usual type of tenter frame which positively grips the selvages of the fabric and pulls it from the roll 32 over the roller 20. It is obvious that any suitable type 55 of drying means may be employed, preferably one which will simultaneously pull the cloth. I provide suitable means to vary the speed of rotation of said roller or driving means of said roller and, in my preferred embodiment, said driving means comprising the driving means 36 of 60 the drying means 38 employed, which may be varied in any well known manner as in the various types of driving means for drying cans or tenter frames employed today.

I also preferably provide means to vary the 65 time interval or duration of the arc 34 of contact of the reverse 18 of said fabric with the periphery of the roller 20. In my preferred embodiment, said means comprises the horizontally 70 mounted roller or bar 40 suitably mounted in the trunnions 42 vertically adjustably mounted in the vertical slots 44 of the supporting brackets 46 mounted on each side of said tank 28 (see Figure 2), said roller or bar 40 being vertically ad- 75 justable up and down within said slots 44 by

means of screws 48 passing through suitable 5 holes in the upper ends of said brackets 46, with the lower ends 50 thereof abutting said trunnions 42 and the upper ends provided with the rotatable hand wheels 52. It is obvious that by rotation of hand wheels 52, the bar 40 may be 10 vertically adjustably mounted adjacent or on said tank 28 to abut the face 16 of said fabric in front of said roller 20 to vary the arc 34 of peripheral contact of said reverse 18 with the 15 periphery of said roller 20 and hence the time duration of said peripheral contact. It is thus apparent that the amount of penetration of said liquid into said fabric may be additionally varied by varying the arc of contact 34 of the re- 20 verse of said fabric 18 with said roller 20. To further vary the degree of penetration, the tank 28 may be movable over the surface of the floor 54 relative to the portion of initiation of drying of said drying means 38 to vary the time interval 25 between said arc of contact 34 and the time of drying initiation of said drying means to additionally regulate the amount of said liquid material impregnated on the reverse of the fabric.

The bath of dyeing or finishing material may 25 be made up in any desired manner, any suitable type of finishing or dyeing materials may be employed, and it is obvious these may be varied to regulate the degree of softness and other characteristics desired in the finish, suitable fin- 30 ishing baths being made up from starches, dextrines, sizing compounds, etc. Any suitable types of dyes for dyeing may be employed such as commercial direct colors or otherwise.

It is also apparent in employing my improved 35 method and apparatus that the degree of penetration of the dye or finish from the reverse through the figure or pattern-forming portions 14 may be so regulated as to not dye or finish 40 said portions 14 at all, to dye or finish portions only thereof partially or entirely, or to partially dye or finish the entire portions in a different degree from the ground 12.

It is apparent, therefore, that I have provided a novel type of fabric, a novel type of method of 45 making said fabric and a novel type of apparatus preferably for use therein with the advantages described above.

It is understood that my invention is not limited to the specific method described and that 50 various deviations may be made therefrom without departing from the spirit and scope of the appended claims.

What I claim is:

1. The method of finishing or dyeing fabrics 55 having a flat reverse and raised pattern-forming or figure portions on the face directly connected thereto to produce a dyed or finished fabric having undyed or unfinished pattern portions which 60 comprises, applying a film of liquid finishing or dyeing material to the periphery of a rotatable roller, drawing the fabric in sheet form from a source of sheet form supply over the surface of 65 said roller to feed said film of liquid material to the reverse of said fabric by peripheral contact with said roller and at a time interval thereafter drying said fabric to produce the desired penetration of said film into said sheet of fabric and 70 controlling the depth of penetration of said liquid into said raised portions by varying the arc of contact on the reverse of said fabric with said roller, the speed of said fabric and the time interval between said liquid material applying and drying steps to dye or finish said sheet with- 75

out substantially affecting said raised pattern-forming portions.

2. The method of finishing fabric having a flat reverse side and raised pattern-forming or figure portions on the obverse side thereof and directly connected thereto to produce a finished fabric having the pattern-forming or figure portions unfinished, comprising the steps of: moving the fabric in sheet form through a liquid applying and drying zone; applying a liquid finishing material to the reverse side of said fabric as said fabric enters said zone; at a time interval thereafter drying said fabric to produce

the desired penetration of said finishing material into said sheet of fabric; and controlling the depth of penetration of said liquid finishing material into said raised portions by regulating the amount of liquid applied to a unit area of said fabric, the speed of travel of said fabric, and the time interval between the application of the finishing material and the drying of said fabric, with respect to each other, whereby said fabric is finished without substantially affecting the raised pattern-forming or figure portions thereof.

CLARENCE T. GRAHAM.