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H. HABER

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COLORED FLOCKED FABRICS

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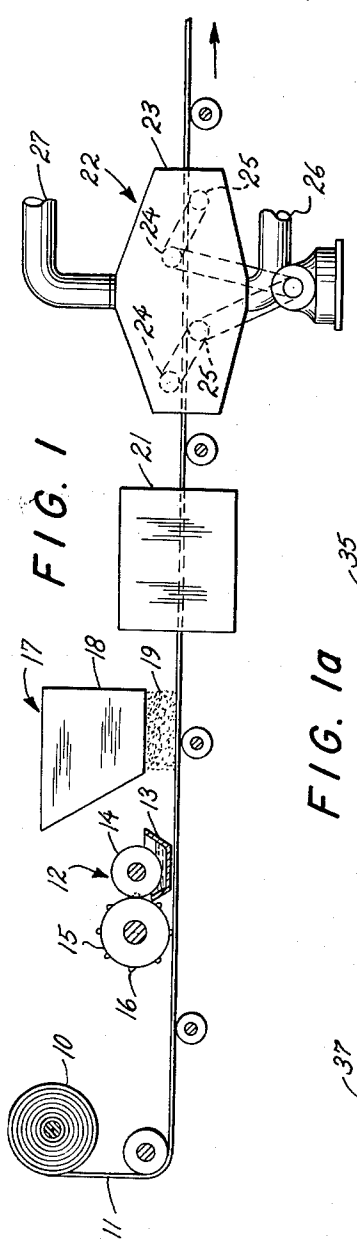


FIG. 1

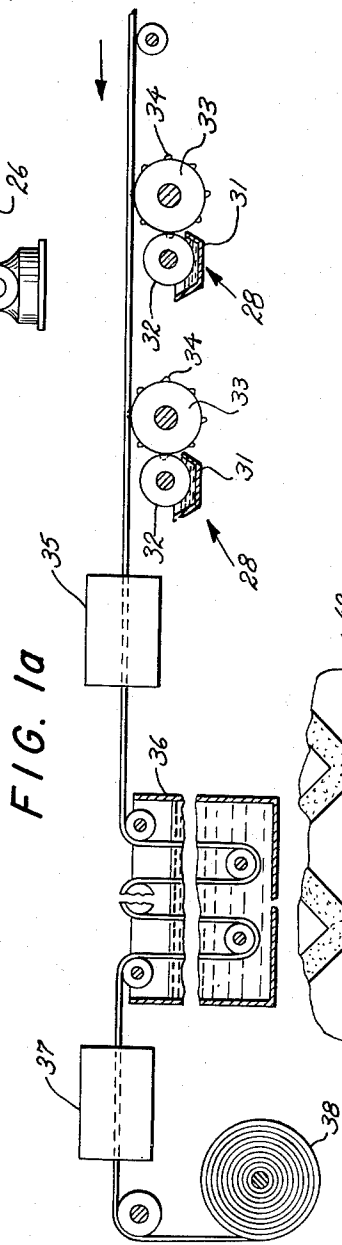


FIG. 1a

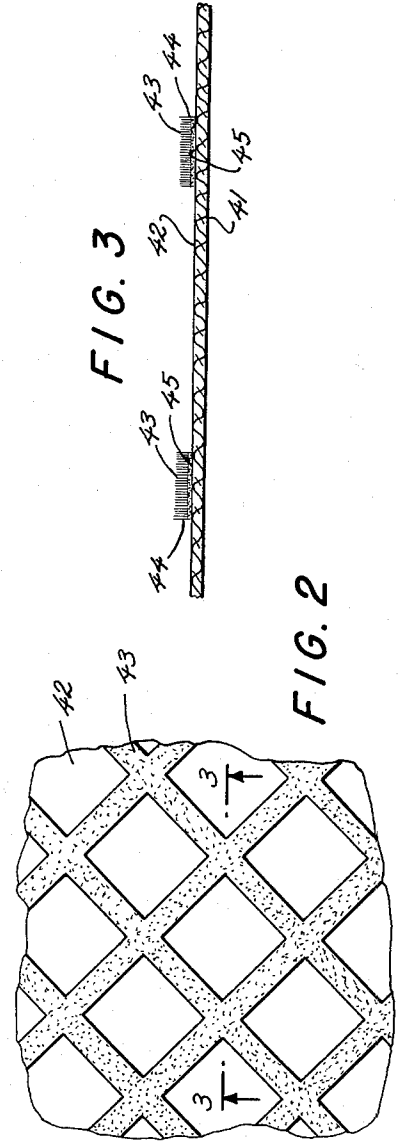


FIG. 2

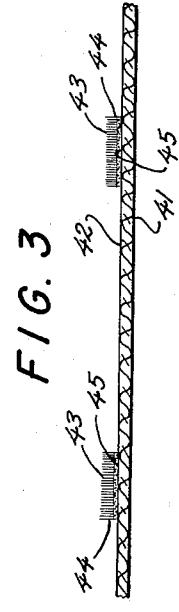


FIG. 3

INVENTOR.
HYMAN HABER
BY
Benjamin Sweedler
ATTORNEY

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COLORED FLOCKED FABRICS

Hyman Haber, New York, N.Y., assignor to Allied Textile Printers, Inc., Paterson, N.J., a corporation of New Jersey

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5 Claims. (Cl. 8-62)

This invention relates to flocked fabrics having colored flocked areas, and more particularly to such flocked fabrics providing pleasing contrasting effects between the unflocked or depressed areas and the flocked or raised areas. Thus the fabrics of this invention provide a dual contrast, namely the surfaces of the unflocked and flocked areas are in different planes and have different colors or produce different color effects.

It is among the objects of the present invention to provide a flocked fabric consisting of a base having flocked areas thereon sharply delineated to form any desired design or pattern which flocked areas are colored to produce one or more colored effects and to provide a pleasing raised colored design contrasting with the relatively depressed and unflocked areas which are free of the color applied to the flocked areas.

It is another object of the present invention to provide a process for producing such flocked fabrics.

Other objects and advantages of this invention will be apparent from the following detailed description thereof.

In accordance with this invention, a polyester fabric, dyed if desired to produce a polyester fabric base of any desired color, has first applied thereto a flocking adhesive in any desired pattern. Thereafter cellulosic flock is applied to the fabric, the adhesive then set and the excess flock thereafter removed so as to leave the areas of the polyester fabric to which no flocking adhesive was applied completely free of flock. The thus flocked polyester fabric is then printed with a printing paste containing as the color component a reactive dye which reacts with the cellulosic flock but does not stain the polyester fabric, which printing is carried out to form any desired design in one or more colors on the flock. The thus printed flocked fabric is then treated to set the printing, i.e. to make it wash and color fast. The fabric, after this setting treatment, is given a wash and soap treatment to remove any of the reactive dye which may have migrated or otherwise been applied to the unflocked areas of the polyester fabric.

There thus results an unusually attractive and pleasing colored flocked fabric consisting of a polyester base having flocked and unflocked areas arranged to form any desired design or pattern, the flocked areas having cellulosic flock colored with a reactive dye which reacts with the cellulose to form a wash-fast and substantially light-fast cellulosic flock having a colored pattern or design which colored flock contrasts with the unflocked or relatively depressed areas of the polyester base free of the reactive dye color or colors applied to the flocked areas.

As the polyester base, any of the commercially available polyester fabrics, such as the fabrics produced from the well known ethylene glycol and terephthalic acid condensation polymers manufactured and sold by E. I. du Pont de Nemours & Co., Inc., under its trademark Dacron, may be employed. The invention, however, is not limited to the use of Dacron as the polyester base but includes other polyester fabrics such, for example,

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as those made from Teron, a polyester fiber made by Fiber Industries; T-900, a polyester fiber made by Tennessee Eastman Co.; Terylene, a polyester fiber manufactured by Imperial Chemical Industries Limited; Tergal, a polyester fiber manufactured by Societe Rhodiaceta; Diolen, a polyester fiber manufactured by Vereinigte Glanzstoff Fabr.; and Terlenka, a polyester fiber manufactured by Algemene Kunstzijhde Unie. The base should consist entirely of the polyester fibers. While polyester fabrics are preferred, the invention is not limited thereto and includes the use of other non-cellulosic synthetic fabrics which have no affinity for reactive dyestuffs which will react with cellulose.

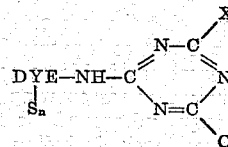
The polyester fabric, if desired, may be dyed with any of the dyes employed in coloring polyester fabrics. Examples of such dyes are the Latyl colors manufactured by E. I. du Pont de Nemours & Co., Cellitone colors manufactured by General Dyestuffs and the Amacron colors manufactured by American Aniline and Film Co.

The flocking adhesive used may be any adhesive employed in the flocking art effective to securely bond the flock to the fabric base. As such adhesives are well known, it is believed further description thereof would serve no useful purpose.

The printing paste containing the reactive dye contains from 2% to 7%, preferably about 5%, of the reactive dye, from 40% to 50%, preferably about 45%, thickener such as a gum or cellulosic thickener or sodium alginate solution, a small amount, from 1% to 2%, sodium bicarbonate, and the rest water.

The cellulosic flock is rayon or viscous flock readily available commercially.

The reactive dyes used in practicing this invention are any of the cellulose reactive dyestuffs which will combine chemically with the molecules of the cellulose flock. One type of reactive dyes are those having the chemical formula:



in which DYE is a chromophor, such as an azo, anthraquinone or phthalocyanine structure with sulfo groups (S_n), and X is a chlorine atom or an inactive radical which may contain a solubilizing group. Examples of such reactive dyes are disclosed, for example, in United States Patents 2,892,670, 2,892,828, 2,892,829, and 2,892,831, all granted June 30, 1959. Reactive dyes are sold by Ciba Co., Inc. under its trade name Cibacrons, by Imperial Chemical Industries Limited under its trade name Procions and by Carbic Color and Chemical Company under its trade name Remazols. This invention includes the use, as the color constituent of the printing paste, of any dyestuff which will react with cellulose to form a color-fast reaction product but will not stain the polyester or other fabric base carrying the cellulosic flock to an extent that the dye cannot be readily removed, for example, by washing with a detergent or soap solution.

For a fuller understanding of the nature and objects of this invention, reference should be had to the following detailed description taken in connection with the accompanying drawing in which:

Figures 1 and 1a together show a diagrammatic layout of the equipment for practicing the process of the present invention; Figure 1 runs from left to right and Figure 1a from right to left; while in Figure 1a the web is shown as having been reversed, i.e. the flocked surface's on the underside, it will be appreciated that this is

for illustrative purposes only and the web need not be reversed between the flock removal and flock printing steps;

Figure 2 is a fragmentary plan view of a colored flocked fabric embodying the present invention; and

Figure 3 is a fragmentary vertical section on a greatly enlarged scale taken in a plane passing through line 3—3 of Figure 2.

In the drawing, 10 indicates a roll of polyester fabric or other synthetic fiber fabric which is not stained by a cellulosic reactive dye. This fabric 11 is unwound from roll 10 and fed through a flocking adhesive applicator 12. This applicator consists of a container 13 for the flocking adhesive having rotating therein a feed roll 14 arranged to transfer the adhesive from the container 13 to the applicator roll 15 having raised areas 16 or depressed areas thereon forming the desired design. The flocking adhesive is thus applied in the desired design, i.e. to selected areas of the polyester fabric 11.

From the flocking adhesive applicator 12, the polyester fabric having the adhesive applied in selected areas passes to a flocking station 17 where cellulosic flock is applied by flocking equipment such, for example, as a conventional electrostatic flocer or as shown in the drawing, from a hopper 18 provided with a screen at its base through which the flock 19 is discharged continuously onto the moving web passing therebeneath.

From the flocking station 17 the web having the flock applied thereto passes to a drying oven 21 where the flocking adhesive is set. The temperature to which the polyester fabric is heated in this drying oven will, of course, depend on the particular adhesive used and the rate of movement of the web through the oven. In general, heating of the flocked web to a temperature of from 200° to 300° F. for from 3 to 5 minutes will firmly bond the cellulosic flock to the underlying polyester fabric in those areas containing the flocking adhesive.

The flocked web then passes into and through a flock remover 22 comprising a chamber 23. The flocked web passes through the approximate median of chamber 23 and while passing therethrough is held along the edges by rollers 24, 25 engaging the web on the opposite sides thereof and holding it taut as it passes through chamber 23. Air or other inert gas is blown by a blower into chamber 23, the current of gas entering through conduit 26 and passing through and around the side edges of the flocked fabric. Excess flock, including all flock applied to the areas of the polyester fabric base to which no adhesive had been applied, is thus removed from the fabric, the current of gas carrying the flock being exhausted through conduit 27 which communicates with a suitable separator, such as a filter bag for separating the flock from the gas.

From the chamber 23 the cellulosic flocked polyester fabric passes to a printing station 28 where it is printed with the desired pattern in one or more colors employing a printing paste containing as the color constituent a reactive dyestuff which will react with the cellulose flock but will not stain the polyester base. Since the printing paste employed will not stain the polyester base and can readily be removed in the subsequent washing operation from the polyester base, it is not necessary to take any extra precautions to make sure that the printing paste is applied only to the flocked areas. Printing can be accomplished by conventional printing equipment involving, for example, printing paste container 31, feed roller 32 for receiving the printing paste from container 31 and applying the same to an applicator roller 33 having the desired raised design areas 34 thereon and which applies the printing paste in such design to the flocked areas of the fabric.

One or multiple stage printing may be utilized to apply a pattern in one or more colors on the flocked areas. While the drawing shows two separate printing units, each supplied with a different color paste, any desired

number of such units can, of course, be used, or the flocked fabric printed in one press which is designed to apply one or more colored patterns to the flocked areas.

From the printing station the fabric passes through an ager or heating chamber 35 where it is heated to a temperature of from 215° to 220° F. for from 9 to 10 minutes. This causes the reaction between the dyestuff applied to the cellulosic flock and the flock to go to completion. Thereafter the thus treated polyester fabric is washed in washer 36 with a warm soap solution, desirably at a temperature of 150° to 160° F., which solution contains a suitable cationic surface active agent such, for example, as a soap solution containing pyrolidone (Textragin A). The wash with the aqueous soap solution effects the removal of any dye which might migrate or otherwise be applied to the unflocked areas.

The washed fabric is then dried in dryer 37 and batched, for example, by rolling to form rolls 38 of predetermined lengths.

It will be appreciated that the showing in the drawing is schematic; that the fabric may be rolled after passage through drying oven 21 and then unrolled for passage through flock remover 23. Similarly the fabric may be batched upon leaving flock remover 23 and later printed as hereinabove described when convenient. In other words, the treatment of the polyester base need not be continuous but may be interrupted to suit plant design or for other reasons.

The process results in a novel colored flocked fabric shown in Figures 2 and 3, involving a polyester fabric base 41 provided with depressed unflocked areas 42 having thereon flocked areas 43 consisting of cellulosic flock 44 colored with a reactive dye or dyes chemically bonded with the flock by the adhesive layer 45. While in Figures 1 and 2 of the drawing a diamond pattern is shown in which the depressed and unflocked areas 42 are sharply delineated by the intersecting bands of flocked areas 43 bearing a multi-colored design, it will be appreciated that any desired design or pattern can be produced.

Since certain changes in carrying out the process and certain modifications in the colored flocked fabrics which embody the invention may be made without departing from the scope of this invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A flocked fabric consisting of a polyester base composed entirely of linear aromatic dicarboxylic acid polyester fibers and cellulosic flock firmly bonded with said fabric base in selected areas forming an ornamental design, said cellulosic flock having thereon a colored design printed with a printing paste containing a reactive dye, which dye reacts chemically with the cellulose of the flock and is thus bonded therewith, the unflocked areas of said fabric being substantially free of said reactive dye.

2. A flocked fabric as defined in claim 1, in which the fabric base is composed of fibers consisting of condensation polymers of ethylene glycol and terephthalic acid.

3. The process of producing a flocked fabric which comprises applying a flocking adhesive in a predetermined pattern to a fabric base composed entirely of linear aromatic dicarboxylic acid polyester fibers, applying cellulosic flock to substantially the entire area of said base, heating the flocked base to set the flocking adhesive and thus firmly bond the cellulosic flock to the areas of the base containing the flocking adhesive, removing the excess flock including the flock applied to the areas containing no adhesive from the fabric base, printing the fabric base with printing pastes containing reactive dyes to form a multi-colored design on the flocked areas of said base, heating the printed base to set the reactive dyes on the cellulosic flock, subjecting the thus treated printed

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base to a washing and soaping treatment to remove dyes applied to the unflocked areas, and thereafter drying the washed fabric.

4. The process of producing a flocked fabric which comprises applying a flocking adhesive in a predetermined pattern to a fabric base composed entirely of linear aromatic dicarboxylic acid polyester fibers, applying cellulosic flock to substantially the entire area of said base, heating the flocked base to set the flocking adhesive and thus firmly bond the cellulosic flock to the areas of the base containing the flocking adhesive, removing the excess flock including the flock applied to the areas containing no adhesive from the fabric base, printing the fabric base with printing pastes containing reactive dyes to form a multi-colored design on the flocked areas of said base, heating the printed base to a temperature of

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from 190° to 220° F. for from 9 to 10 minutes, subjecting the thus treated printed base to a washing and soaping treatment at a temperature of from 150° to 160° F. and thereafter drying the washed fabric.

5. The process as defined in claim 4, in which the fabric base consists entirely of fibers made from ethylene glycol and terephthalic acid condensation polymers and the cellulosic flock is from the group consisting of viscose and rayon flock.

References Cited in the file of this patent

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