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Lyons et al.

[11] **3,751,284**

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[54] **TONE-ON-TONE RESIN BONDED PIGMENTING OF FLOCK PRINTED FABRIC WITH LOW TEMPERATURE AIR DRYING**

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[52] **U.S. Cl.** **117/28,** 117/13, 117/25, 117/20, 117/29, 8/14, 8/62, 1/76

[51] **Int. Cl.** **D06q 1/00**

[58] **Field of Search** 8/14, 62; 117/13, 117/37

[56] **References Cited**

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2,981,588	4/1961	Haber	117/13
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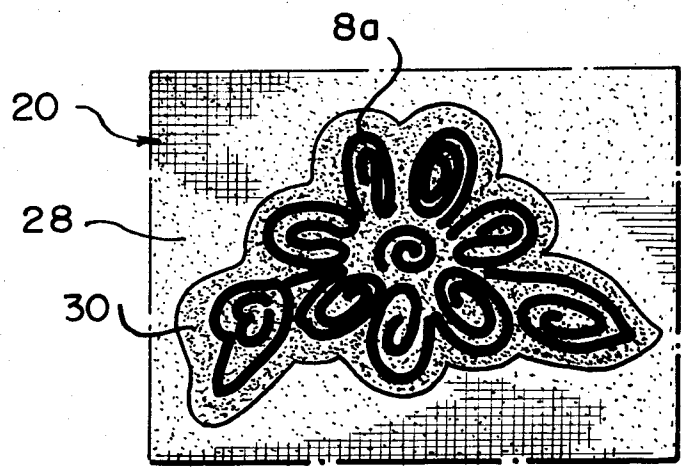
[57] **ABSTRACT**

Differentiated or multi-toned dyeing effects are obtained on flock-printed fabrics by impregnating said fabrics with a dyestuff solution or dispersion, then drying at room temperatures. By control of the rate of drying a ring of a more concentrated dyeing surrounding a less concentrated dyed area produced at relatively high rates of speed.

3 Claims, 3 Drawing Figures



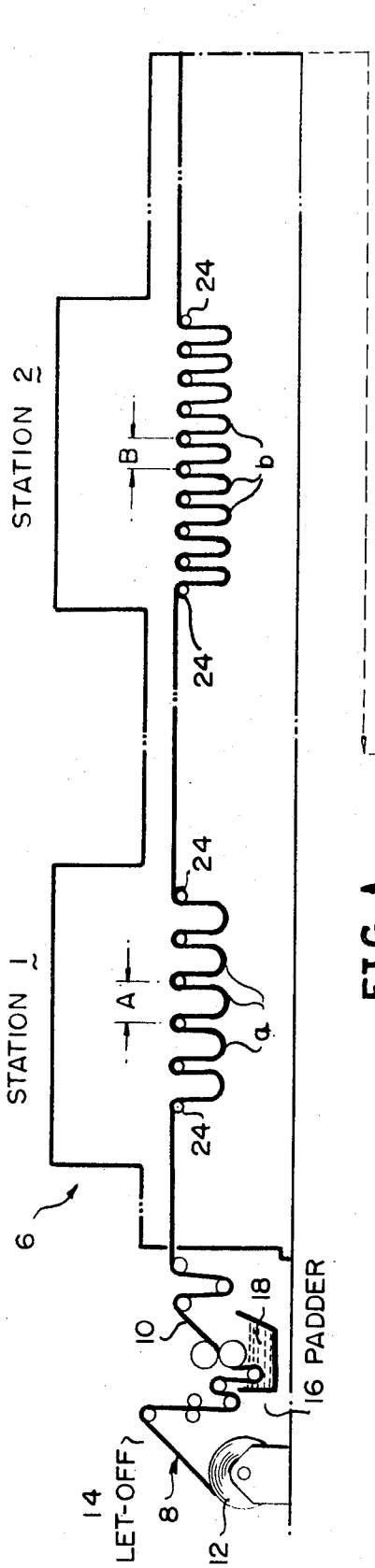


FIG. 1

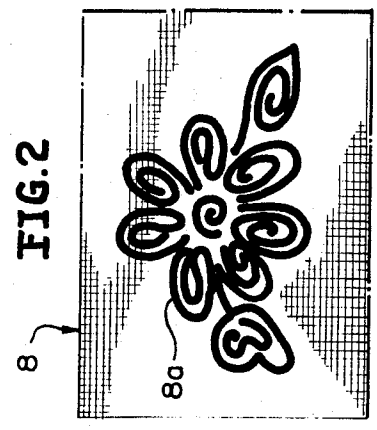


FIG. 2

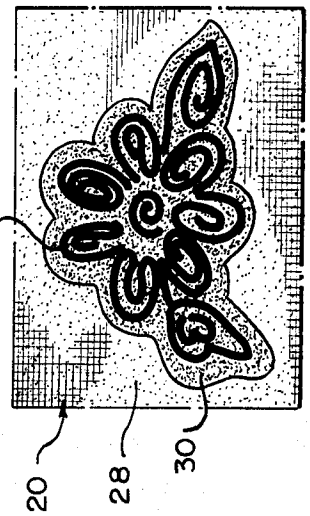


FIG. 3

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TONE-ON-TONE RESIN BONDED PIGMENTING OF FLOCK PRINTED FABRIC WITH LOW TEMPERATURE AIR DRYING

BACKGROUND OF THE INVENTION

The present invention relates to the field of dyeing of fabrics, more particularly in the dyeing of flock-printed fabrics to produce contrasting effects between the flocked and unflocked areas.

The flock-printing of fabrics by applying a flocking adhesive in a desired design to the fabric, then applying the flock from a hopper, setting the adhesive in a drying oven and removing the non-adherent flock, is well known. An example of such flock-printing is shown in the U.S. Pat. No. 2,981,588, issued Apr. 25, 1961, to Haber, FIG. 1. The thus flock-printed fabric may then be dyed or printed with a printing paste having differing affinities for the base fabric and the flock fiber. The resulting fabric has a flock design which contrasts in color with the depressed background, and without migration of the dye.

SUMMARY OF THE INVENTION

It is an object of the present invention to obtain unusual and novel dyeing effects on flock-printed fabrics, wherein a differential or multi-toned effect having a pronounced ring or halo of a concentrated dyeing surrounds a much less concentrated area.

It is a further object of the invention to carry out such controlled dyeings at sufficiently high rates of speed for practical commercial operation.

The present invention is based upon the discovery that a pronounced ring or halo of a concentrated dyeing surrounding the flocked area of a flock-printed fabric resulting from the migration of dye could be achieved by controlling the rate of drying at temperatures of from 40° F. to 110° F., following impregnation of the fabric with dyestuff solutions or pigment dispersions.

The desired tonal effects are achieved in varying degrees on all types of textile fabrics. Best effects are produced on base filament constructions of synthetics, such as polyester, nylon, acetate, rayon and fiberglass. As flock material, rayon, nylon, acrylic and polyester flock yield good effects, with the preferred flock material being rayon.

It has been found that any pigment dispersion or dyestuff solution now used conventionally can be used in the tonal dyeing process of the present invention. Thus dyestuff types including pigments, reactives, directs and azoics have been found to be effective, the preferred types being pigments.

The time required for drying may vary from 4 minutes to 3 ½ hours and is dependent on the weight of the fabric. An average drying time for a filament synthetic sheer is 40 minutes, while that for a heavy weight poplin is 3 ½ hours.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagrammatic view of a large capacity dryer into which the dyed and wet flock-printed fabric is passed.

FIG. 2 is a fragmentary portion of fabric showing a flock-printed design prior to tonal dyeing.

FIG. 3 is the fabric of FIG. 2 illustrating the results of the present invention which is a tonal or multi-toned effect.

The drying may be carried out by passing the dyed and wet flock-printed fabric **10** into a large capacity dryer **6**, such as a festoon dryer, illustrated diagrammatically in FIG. 1 of the accompanying drawing. As shown, the flock-printed material **8** from the roll **12** at the let-off **14** is passed through a padder **16** in which the fabric is impregnated with the dye or pigment **18** and then passed through a series of stations **1, 2,** and **3** enclosed in a drying chamber and the tonal fabric **20** thence collected on a winder **22.** Any type of air circulation is detrimental to the desired migratory effect of dye or pigment and hence forced circulation of air on the impregnated fabric as by circulating fans in the drying ovens is avoided until the desired migratory effect has visually occurred.

As seen in the drawing, the spacing of the poles **24** produces loops *a*, *b*, and *c* at each succeeding station which are relatively less than that at the preceding station. As an example the spacing of "*a*" may be 18 inches, that of "*b*" may be 12 inches, and that of "*c*" may be 6 inches. The dryer is not heated and is allowed to reach an ambient temperature.

FIG. 2 represents a fragmentary portion of material **8** with a flocked design **8***a* produced thereon, this flocked printed material is now dye-impregnated and advances into a large capacity dryer and through its subsequent drying stages to produce the aesthetically appealing tonal dyed fabric **20** of FIG. 3.

The effects of tonal dyeing in accordance with the present invention may be viewed in FIG. 3 wherein the tonal dyed fabric **20** clearly defines a less concentrated dyed background area **28** with a contrasting concentrated dyed ring or halo **30** surrounding the relatively undyed flock-print design **8***a*, while FIG. 3 is a small segment of a piece of fabric, it should become apparent that, by controlled migratory dyeing, pattern and design arrangements, commercial yard goods can be produced having differential or tonal appeal.

EXAMPLE

A filament fabric composed of 100 percent polyester fibers of 70 denier weight in a basic ninon construction which had been electrostatically flock-printed with a random pattern of rayon flock, and heat treated for high temperature (180° F.–350° F.) cure of the flock adhesive, and cleaned of excess flock was employed for tonal dyeing.

The flock-printed fabric was padded with a pigment dyestuff dispersion at room temperature through a pad roll on a conventional printing machine. The pigment dispersion was typically formulated as follows:

6 lb. 4 oz.—Sherdye Red [3 W (Pigment Concentrate)]
20 lb.—Rohplex K-3 (Acrylic Emulsion)
1 quart—Ammonia
1 lb.—Ammonium Sulphate
1 ½ lbs.—Quadrofas (Sodium tetraphosphate, $Na_2P_4O_{13}$)
6 cc—Antefoam G (Silicone emulsion — A water dispersable silicone defoamer)
Made up to 50 gallons with water.

Following the application of the pigment, the dyed fabric was continuously fed into a festoon dryer as shown in FIG. 1, operating at essentially ambient room temperature or 70° F., in the absence of any forced circulation of air. The fabric was allowed to dry at this

temperature for 40 minutes, removed from the dryer, and plaited into a finishing truck. The fabric was then conventionally inspected, graded, and wound.

While parts arrangements, process steps, examples and article design embodying the invention have been disclosed herein, it is to be understood that variations in the above may be made without departing from the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. A process for the tonal dyeing of flock-printed fabrics, comprising padding the flock-printed fabric with a resin bonded pigment dispersion, and subjecting the thus padded and wet fabric to air drying at an ambient temperature of from 40° F to 110° F for a time period of from 4 ½ minutes to 3 ½ hours depending on fabric weight in a drying station which is free of air circulation.

2. The process as defined in claim **1** wherein the flock-printed fabric is composed of a polyester base flock-printed with rayon flock.

3. A flock-printed fabric dyed in accordance with the process of claim **1**.

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