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PROCESS OF PRINTING TEXTILES WITH A POWDERED BLANKET

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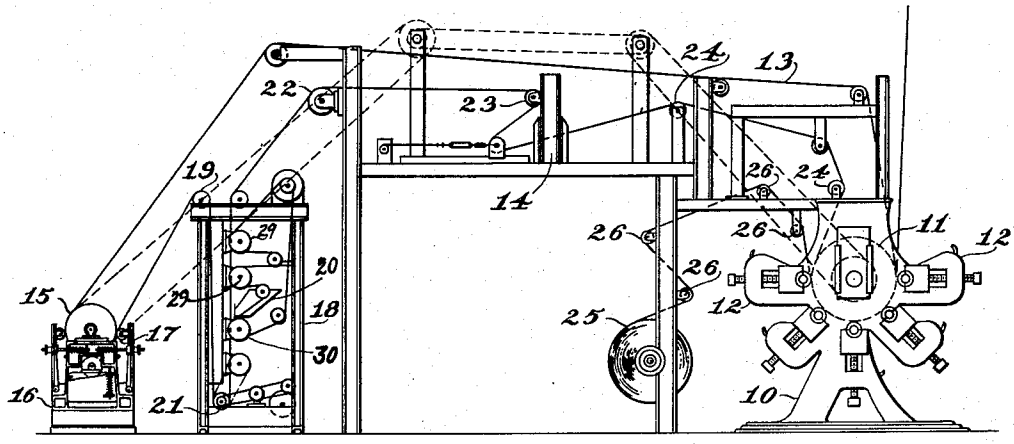


Fig. 1

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PROCESS OF PRINTING TEXTILES WITH A POWDERED BLANKET

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5 Claims. (Cl. 101—423)

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The present invention relates to the printing of textile material and more particularly to an improved process of the type in which an endless waterproof blanket is employed.

There are two general types of textile printing processes: one, the older process, in which a length of cloth known as a back-gray is run beneath the textile web which is being printed to absorb color paste from the engraving beyond the selvage or any excess color paste which may be driven through the cloth by the pressure of the printing roll. The other is the more modern wash-blanket process, in which the textile web being printed runs directly on an endless waterproof blanket which is passed about the impression cylinder and continuously washed free of color paste and then dried in an adjacent part of the printer before it is returned to the printing station.

The wash-blanket process is the more restricted in its range of adaptability to various patterns and colors. A principal reason for this is the difficulty of washing the color from the blanket, especially when colors having a water-immiscible vehicle are used. Nonetheless, the wash-blanket process is preferred where it can be used, because it eliminates the large yardage of cloth needed for back-grays. It also saves a considerable amount of printed goods, for a back-gray will wrinkle, will scrimp, and will tear. Each means a misprint and wasted material.

Accordingly, it is an object of the present invention to provide an improved printing process which does not employ a back-gray but which nevertheless is suitable for printing a wider variety of patterns, colors, and cloth weaves than has been possible in the past, which employs no heating step to dry the blanket and consequently better maintains the viscosity of the color paste, and to provide a process in which the color is more easily removed from the blanket and in which "fitting" the pattern is more easily accomplished. My present invention allows a very great variety of patterns to be printed. It permits a wide variety of colors to be used; i. e., soluble dyes in a starch or gum base, pigments dispersed in a starch or gum base, insolubilized starch colors, and resin emulsions of the water-in-oil or oil-in-water type. All these may be printed without a back-gray and at much higher speeds and lower costs than has heretofore been possible.

I have discovered that textile printing colors may be dispersed more rapidly when wetted, and hence are washed off a blanket more thoroughly,

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if the colors are absorbed on individualized discrete powder particles carried by the blanket. I have discovered also that dry powder picks up the surface film of moisture which remains on the blanket after washing and holds it so tenaciously that staining of the goods is prevented. Accordingly, my textile printing process based on these discoveries applies a dry, finely divided powder to a waterproof textile printing blanket after it has left the washer and before it enters the printing station. When this is done, I find that the hot air drying of the blanket previously required to remove the surface film of water left on the blanket by the washer is unnecessary, and I find that cleaning of the blanket in the washer which, especially when the colors contained water-immiscible ingredients, was but partially effective, is now complete.

The drawing shows the general arrangement of a textile printer on which the process may be practiced. Numeral 10 indicates a conventional textile printing machine having an impression cylinder 11 and color rolls and pans 12—12. An endless impervious blanket 13 passes around the impression cylinder 11 and, after passing over a super-structure 14, the purpose of which is to provide head space and working room for the operators, loops around the main drive roll 15 of a blanket washer 16. The washer is provided with water sprays and rotary brushes so that the blanket is thoroughly cleaned as it is passed through this element of the machine. As the blanket leaves the washer 16, it passes between the drive roll 15 and the squeeze roll 17, the purpose of which is to remove by a wringer action as much water as possible from the surface of the blanket. The blanket next enters the powder applicator 18 by looping around the guide roll 19 and the reversing roll 21. In the applicator a dry finely divided powder from the supply chute 20 is applied to the surface of the blanket by rotary brush 30. The upward flight of the blanket passes from the applicator 18 over the guide roll 22, over the take-up rolls 23—23 and the guide rolls 24, and completes its circuit around the impression cylinder 11. The roll of unprinted goods is shown at 25, the run of which passes over goods guide rolls 26—26 and then passes around the impression cylinder on top of the blanket 13. The printed goods then passes upwardly to the drying gallery or drying rooms, which are usually located on the floor above.

The loose, dry powder, which is applied to the blanket by the applicator 18, absorbs the surface film of moisture which is left on the blanket 13

after it has passed the squeeze roll 17. If the blanket is provided with an indented surface, the brushes 29 force the powder into all depressions in the blanket surface. As a result, the blanket 13 as it leaves the applicator 18 not only is free of surface moisture but carries a measurable amount of color-absorptive powder in the depressions and, generally, a small amount of powder over the entire face.

The details of construction of the powder applicator are no part of the present invention; any suitable mechanism which will apply a dry powdered material to the blanket may be used. The powder may be applied in an excessive amount and then partially removed by doctoring or by brushing, as illustrated at 29 in the drawing, or the powder may be initially applied in the correct amount by a mechanism which continuously applies a controlled, measured quantity. Sufficient powder should be used to assure complete removal of color from the blanket in the washer and to prevent interference with satisfactory printing by any moisture which may remain on the blanket after it leaves the washer. The amount will depend on the conditions of the particular print job and can be readily determined by the machine operator. Generally, for most types of goods, patterns and colors, I have found between one and thirty pounds of powder for each 1000 yards of goods printed to be satisfactory. In general, the least amount of powder which will produce satisfactory printing and cleaning of the blanket should be used.

The charge of powder which remains on the blanket as it leaves the impression cylinder is ultimately lost. Its function is to carry away the color which drains out of the engraving beyond the selvage and to absorb any color which is driven through the goods in printing. It thus becomes charged with color. The mixture of color and powder is washed off from the blanket by the washer 16 and is disposed of as sludge effluent from the washer.

Powder consumption of the process is variable since it largely depends upon the pattern and the type of color.

A wide variety of powders may be used in the process. Examples are talc, powdered mica, powdered vermiculite, infusorial earth, fuller's earth, bentonite, starch, dextrines, Georgia clays, Kaolin, hydrophilic gums such as karaya gum, locust bean gum, and finely divided inert minerals such as powdered silica. In certain instances it is advantageous to use a powder of the water-expanding-space-lattice type such as bentonite, which when wet swells violently and disrupts the superficial color coating on the blanket. Mixtures of powders of different materials may be used.

Preferably, I provide on the surface of the blanket a multitude of minute indentations of sufficient aggregate volume to accommodate the color from the engraving of the roll. However, the finer the pattern, the tighter the weave of the cloth, or the more completely the color is held in the goods, the less is the need for great color-carrying capacity in the blanket. Also, if the pattern leaves a white margin, much less color-carrying capacity is required. Consequently, some patterns may be printed on a smooth surface blanket satisfactorily, because the engraving on the printing roll does not hold enough color to cause trouble. A modified blanket surface, accordingly, is not always necessary in the functioning of my invention,

but when used gives a far wider range of usefulness to the process and machine.

In the conventional wash-blanket process, the temperature of the blanket when it reaches the printing station is in the neighborhood of 140° F., for it has just left the tunnel drier. This temperature is sufficient to produce a considerable drop in the viscosity of the color. Consequently, at the instant of printing, color is frequently more liquid than it should be, and this causes trouble. Wash blankets average 40 yards in length, and, as the machines are customarily designed, the color on the blanket must travel about 16 yards after it has been applied and before it reaches the washer. At this temperature, considerable evaporation of water in the gum base color or other volatile ingredients takes place, and the colors become quite hard, horny and difficult to remove.

In contrast, the only heating which takes place in my improved process comes from the mechanical working of the blanket at the printing station and over the blanket reversing rolls, and the small amount added by the warm wash water. The amount of heat added to the blanket by the warm water is negligible. The blankets, consequently, run but slightly above room temperature, so that the viscosity of the color is not lowered and after leaving the printing rolls the color is not hardened appreciably. As a further result of this lower temperature, abrasion of the working surface of the blanket is less than in the conventional process. A further decrease in abrasive wear of the blanket surface is obtained by the lubricating and anti-friction effect of the powder on the surface.

Surprisingly, it has been found that "fit" (the proper registration of colors across the width of the goods as well as longitudinally) is much improved by my new process. "Poor fit" apparently is caused not only by the sagging of the central portion of the goods but also by the seizing of the goods in the displaced position on the blanket, and I explain the improved fit by the fact that when the blanket is covered with powder, seizing is impossible.

I claim:

1. The process of textile printing which includes as continuous steps first applying finely divided powder to the surface of a continuous printing blanket, then applying color to the textile while the textile is superposed upon the blanket, the color being applied in such quantities that surplus color passes through the textile or is deposited on the edges of the blanket, and subsequently washing the powder and the color from the surface of the blanket and repeating the steps, and by means of said powder absorbing excess color in the printing step, removing excess color with the powder in the washing step, and absorbing moisture remaining on the blanket after washing of the blanket.

2. The process according to claim 1 wherein the powder is applied to the printing blanket while the latter is substantially at atmospheric temperature.

3. The method of printing textile material which includes providing a continuous textile printer wash blanket having areas adapted to hold charges of finely divided powder, and repeatedly charging said areas of the blanket with color absorptive powder, printing the textile while it is superposed on the blanket so charged with said powder, washing the powder and excess color from the blanket, again charging said areas

of the blanket with powder and returning the charged areas of the blanket to the printing surface, and by means of said powder absorbing excess color in the printing step, removing excess color with the powder in the washing step, and absorbing moisture remaining on the blanket after washing of the blanket.

4. The process of textile printing which includes as continuous steps first applying finely divided dry powder to the surface of a continuous printing blanket which is moist with water from washing, then applying color to the textile while the textile is superposed upon the blanket in quantities such that surplus color passes through the textile or is deposited on the edges of the blanket, and subsequently washing the blanket with water to remove the powder and the color and repeating the steps, and by means of said powder absorbing excess color in the printing step, removing excess color with the powder in the washing step, and absorbing moisture remaining on the blanket after washing of the blanket.

5. A continuous textile printing process, which comprises the following as continuous steps, applying finely divided dry powder to the surface of a washed water proof endless textile printing

blanket, while it is still moist with water from washing, passing the blanket through the printing station with textile material superposed thereon, thereby driving color from the opposite side through the textile material and leaving color beyond the selvage and passing the blanket through a washer to remove the powder and the color from the surface of the blanket and repeating the steps, and by means of said powder absorbing excess color in the printing step, removing excess color with the powder in the washing step, and absorbing moisture remaining on the blanket after washing of the blanket.

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