

UNITED STATES PATENT OFFICE.

GEORGE DONALD, OF NORTH ADAMS, MASSACHUSETTS, ASSIGNOR TO THE
ARNOLD PRINT WORKS, OF SAME PLACE.

PROCESS OF PRINTING ON COTTON.

SPECIFICATION forming part of Letters Patent No. 499,161, dated June 6, 1893.

Application filed February 1, 1893. Serial No. 460,559. (No specimens.)

To all whom it may concern:

Be it known that I, GEORGE DONALD, of North Adams, in the county of Berkshire and Commonwealth of Massachusetts, have invented certain improvements in the process of producing and fixing colored figures in cotton material in conjunction with grounds of contrasting colors, of which the following is a specification.

The invention relates to improvements in the process by which figures in the basic aniline colors can be produced and fixed upon cotton material by a mordant of one of the metallic tannates, in conjunction with a ground of contrasting color of alizarine or other dye which has chemical affinity for a metallic mordant such as hereinafter mentioned.

Heretofore imperfect and unsatisfactory results have been obtained in printing colored figures upon or in conjunction with grounds of contrasting color by the pigment method, and also in various instances by printing with aniline colors; for by these prior methods, either the colors have lacked clearness and brilliancy or permanency and durability, which two latter characteristics are the distinguishing features of the calicoes produced by my improved process, by which also an almost endless variety of figures containing many different colors or shades may be produced upon dark as well as upon light grounds.

My invention consists in producing upon cotton material any desired figures by what are known as basic aniline colors, or those which are fixed by a metallic tannate, in conjunction with or upon "grounds" of contrasting colors, dyed with madder, alizarine, or other suitable coloring matter, by applying to the material a suitable mordant for the aniline color, such as tannate of antimony, or other suitable metallic tannate, and a suitable mordant for the alizarine or other dye used, such as acetate of alumina, chromium, iron, or other suitable metallic salt, or the sulphocyanides, or basic sulphates of the said metals, or combinations of them according to the color or shade of color desired, as is well known; then printing upon this mordanted material with the aniline color mixed with a discharge for the metallic dye-mordant, such as citric, tartaric or other organic acid, or an

alkaline salt of said acids, for example, citrate of soda, potash, or ammonia, may be employed as the discharge in place of the acid, and after steaming, dunging and washing the material, dye it with the alizarine or other coloring matter to produce the "ground" and finally cleansing in the usual manner.

A specific, concrete description of my improved process is as follows: First, treat the fabric or other cotton material with an astringent solution containing from one and one-half to two ounces of tannic acid to each gallon of water; then dry. Second, pass the material through a solution containing about two ounces of a salt of antimony to each gallon of water, wash and dry. Third, for a red ground, pad with acetate of alumina, (strength according to shade desired); dry—preferably at a low temperature. Fourth, print in the figures desired, with a mixture composed of one-fourth of a gallon of an aniline color solution, consisting, for example, of one pound of methylene blue, dissolved in one gallon of acetic acid, and one gallon of a standard discharge, consisting of one gallon of water, four pounds of gum-substitute, one pound of starch and four pounds of citric acid; then steam, dung and cleanse. Fifth, dye with alizarine; then wash, cleanse and finish in the usual manner.

The most desirable mode of procedure in the practice of this process is to apply the mordants, for the aniline colors and the dyes, to the material before the colors are applied, but as in the process described in my application Serial No. 458,526 the ingredients of the mordant for the aniline colors must be applied successively, although their sequence and order of application in the several steps of the process may be varied, except in the present process both should be applied before the dyeing operation. But the result may be obtained with a greater or less degree of success by varying the order of the steps in the mode of procedure and the time when the mordants or the ingredients which form the aniline mordant are applied to the cotton material. For example, the following modified modes of procedure may be employed: Pad with tannic acid, dry; pad with acetate of alumina, dry; print with aniline color, dis-

charge for dye mordant, and salt of antimony; steam, dung, &c., then dye; or, pad with tannic acid and acetate of alumina with a solvent for the tannate of alumina which will be
5 formed, dry; pad with salt of antimony, dry; print with aniline color and alumina discharge; steam, dung, &c., then dye; or again, pad with tannic acid and acetate of alumina or other metallic salt, with a solvent for the
10 tannate formed; print with aniline color, organic acid and salt of antimony; steam, dung, &c., then dye. Substantially the same proportions of ingredients may be used in these modified modes as in the concrete illustration
15 hereinabove given and about four ounces of acetic acid may be used as a solvent for the tannate of alumina, or other tannate formed, in the last two modes. It will be observed that in these modified modes the mordants
20 are applied to the material either before the colors which they are intended to fix, or in two instances one of the ingredients to form the mordant for the aniline color is applied simultaneously with the color, but as the other
25 ingredient has previously been applied to the

material, the chemical reaction takes place there and will thus fix the aniline color.

It will be understood by the calico printer that the ingredients and proportions of ingredients which are used must be varied according to the color, and depth of shade of color desired to be produced. 30

I claim—

The process of producing and fixing in cotton material, figures in colors which are fixed 35 by metallic tannate mordants, such as basic aniline colors, in conjunction with dyed grounds of contrasting color; which consists in applying to the material a metallic tannate and a mordant for the dye; printing upon the material so mordanted the desired figures 40 with the color to be fixed by the metallic tannate mixed with a discharge for the dye mordant; steaming and cleansing and then dyeing to produce the ground in the color desired, substantially as described. 45

GEORGE DONALD.

Witnesses:

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