

UNITED STATES PATENT OFFICE.

JOHN BRACEWELL, OF NORTH ADAMS, MASSACHUSETTS.

PROCESS OF FIXING COLORS UPON COTTONS, &c.

SPECIFICATION forming part of Letters Patent No. 505,088, dated September 19, 1893.

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To all whom it may concern:

Be it known that I, JOHN BRACEWELL, of North Adams, in the county of Berkshire and State of Massachusetts, have invented a new and useful Improvement in the Method and Process of Compounding and Applying Alizarine and Aniline Colors in Conjunction upon Cotton Fabrics or Fibers, of which the following is a specification.

My invention relates to the combination of alizarine and aniline colors in conjunction and the process of applying the same in calico printing to produce new and superior effects, and it consists in the compounding, application, and development of alizarine and aniline colors in various patterns upon the goods, substantially as hereinafter described and claimed.

Heretofore various kinds of mordants have been employed to fix and develop on cotton fabrics or fibers these varieties of coal tar colors commonly known in the market as and sold under the name of alizarine and aniline colors, with various results, but the best effects have not always been produced because the mordants used for alizarine colors would not develop and fix the aniline colors with equal brilliancy, or vice versa. This has prevented the use of these colors to a large extent in printing them on the same piece of goods to produce colored patterns, especially in discharge colors or resist effects.

My improvement enables me to employ different mordants with these respective colors to form colored or fancy patterns on the same fabric, in conjunction with each other, so that the mordant best adapted to each color shall produce its appropriate effect in developing and fixing that color, without interfering with the other mordant in developing and fixing its color, so that I obtain a pattern of these different colors in conjunction of the highest degree of fastness, brilliancy and durability which it is possible to obtain, much more easily and cheaply than heretofore, especially with the above colors or effects.

Various methods of compounding and applying the different mordants and colors may be adopted provided that two prerequisites are observed in applying them according to my methods, viz: That the alizarine color with

its mordant shall be so printed or applied to the fabric, either over or under the aniline color printed or applied with its mordant separately, that the subsequent application of heat and moisture, or its steam equivalent, to develop and fix the colors shall not cause either one of the said mordants to interfere with the operation of the other one, in developing the color to which it is especially applicable.

One method of applying these respective colors, *i. e.*, the alizarine and aniline colors with their respective mordants is as follows: Suppose it be desired to produce a pattern with a ground of alizarine slate color, and a pattern figure of an aniline green color, I proceed as follows, viz:

I first make an alizarine blue of these proportions of ingredients: two gallons of starch paste, (one pound to gallon,) two gallons of gum tragacanth, (two ounces per gallon,) four pounds of alizarine blue, (twenty per cent. paste,) one-half gallon acetate of chrome, (32° Twaddell,) composed of the crystals ($\text{Cr}(\text{C}_2\text{H}_3\text{O}_2)_2 + \text{H}_2\text{O}$) dissolved in water.

I next make an alizarine black of these proportions of ingredients: two gallons starch paste, (one pound to gallon,) two gallons gum tragacanth, (two ounces to gallon,) one gallon alizarine black, one-half gallon acetate of chrome, (32° Twaddell,) as above.

I next compound the alizarine slate color out of the above, as follows: two gallons of alizarine black, (as above,) one gallon of alizarine blue, (as above,) twelve gallons of water, two gallons of gum tragacanth, (two ounces per gallon.)

The cotton cloth or yarn should be first passed through a solution of alizarine assistant and prepared in the usual way for printing alizarine colors on it. It is then blotched or padded with the above slate color, and dried at a low temperature.

I next print on the cloth over the alizarine slate color the aniline green color, which is prepared as follows: four gallons starch paste, (one pound per gallon,) four gallons gum tragacanth, (two ounces per gallon,) one gallon of emerald or brilliant green solution (consisting of eight ounces of aniline green dissolved in a gallon of water, or acetic acid, or methylene spirits and water), one-half gallon

of tannic acid liquor, (four pounds to gallon,) one-half gallon of tartaric acid liquor, (six pounds to gallon.) Either the tannic or the tartaric acid liquor may be thickened with starch, if desired.

Instead of starch and gum tragacanth as thickening for the above colors, any other suitable thickening may be used.

The quantity of alizarine black and alizarine blue, or aniline green in the different color mixtures may be varied according to the depth of shade wanted, and the acetate of chrome may be used with the alizarine colors and the tannic acid and tartaric acid with the aniline color, in larger or smaller proportions, but the above will give good results.

After printing the aniline ground color upon the alizarine color mixtures the goods are again dried, using a low temperature if convenient, and run through an aniline ager or continuous steamer. I prefer, however, to use the continuous steamer. After proper steaming it will be found that the combination of the tannic and tartaric acid in the aniline color uniting with the chrome in the alizarine color has discharged the latter where the aniline color is applied, and that the alizarine colors are thoroughly fixed on the fabric, but to complete the fixing and developing of the aniline color the cloth should be passed through a solution of tartaric emetic, containing about two grains to a gallon, or some salt of antimony which will combine with the tannic acid in the aniline color and form an insoluble lake, in which the latter is fixed. After this treatment, soap and wash the cloth in the usual way.

If the cloth is not to be passed through the tartar emetic, or antimony solution, the aniline green color should have mixed with it as much tannic acid as is possible or desirable to incorporate with it to keep in place or fix the aniline color.

Instead of padding the goods, the alizarine colors printed thereon for grounds with covered effects may be used and the aniline color printed on top of such covered effects, and in some patterns the drying between the application of the alizarine and aniline colors may be omitted.

If desired, the aniline color may be printed on the white cloth first and the alizarine colors may be blotched, or padded, or slop padded, or printed with covered effects over the aniline color, instead of being applied under them as first described. The effect in the latter case will be the same as the tartaric acid uniting with the chrome forming a tartrate of chrome, which acts as a discharge for the alizarine colors but does not affect

the aniline color. I regard this as within my invention.

The above method of applying and developing the alizarine and aniline colors differs from the application of aniline or alizarine colors either over or under aniline black, since the aniline black is developed by a process of oxidation when the heat and moisture or steam is applied, while in my present invention the alizarine slate color as well as the aniline green color are respectively developed and fixed by their mordants, which are best suited to each one of them as above described. This permits the discharge of the alizarine colors by the greater affinity of the tartaric acid for the chrome than the salts of the alizarine color or colors have for it, thus preventing the deposit of the insoluble double salt of the chrome and alizarine upon the fabric where the aniline ground color is applied.

Cotton yarn may be printed with my combination of alizarine and aniline colors as well as cotton cloth, if it be found desirable.

What I claim as new and of my invention is—

1. The process of producing and fixing on cotton fabrics or fibers colored patterns with alizarine color grounds, which consists in first padding or dyeing the fabric or fibers with an alizarine color mixture composed of an alizarine color and a metallic mordant, and then printing with a color mixture consisting of an aniline color, a vegetable mordant therefor, and a discharge for the alizarine ground color, and then steaming or aging at such degree as that the alizarine ground color and the color pattern are both simultaneously developed and fixed substantially as described.

2. The process of producing and fixing on cotton fabrics or fibers colored patterns with alizarine color grounds, which consists in first padding or dyeing the fabric or fibers with an alizarine color mixture composed of an alizarine color and a metallic mordant therefor, and then printing with a color mixture consisting of an aniline color, a vegetable mordant therefor, and a discharge for the alizarine ground color, and then steaming or aging at such degree as that the alizarine ground color and the color pattern are both simultaneously developed and fixed, and finally passing the fabric through a solution of antimony to further fix the vegetable mordant of the pattern color, substantially as described.

JOHN BRACEWELL.

Witnesses:

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C. W. BROWN.