

UNITED STATES PATENT OFFICE.

JOHN BRACEWELL, OF NORTH ADAMS, MASSACHUSETTS.

PRINTING ANILINE-BLACK.

SPECIFICATION forming part of Letters Patent No. 500,558, dated July 4, 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 Colors and the Application Thereof for Printing Fabrics, of which the following is a specification.

My invention relates to colors for printing on fabrics, and it consists in a new composition of colors with discharges for anilin blacks, and in the method of applying the same to the fabric.

Great difficulty has heretofore existed in applying and fixing what are commonly known and sold in the markets as coal tar colors on anilin black grounds, so as to render them fast colors. As is well known, anilin black color has superseded all other blacks for printing on cotton goods, owing to its superior stability and brilliancy, but the process of applying and fixing the black color on the goods required such widely different conditions and treatment from that required for coal tar colors, to make the latter fast with the anilin black that it has seriously interfered with the use of such colors in the patterns printed on such anilin black as the ground color. In my Letters Patent Nos. 409,822, 409,823, 409,819 and 409,821 I have heretofore described improvements in anilin black, and in applying thereto resist and discharge substances in patterns, which should leave the pattern developed in white on the black ground color. When it has been attempted to mix and apply with the alkali resist or discharge used in those patents coal tar colors, it has been found necessary to also employ an ingredient which would fix the latter in the presence of the discharge for the anilin black, so that they will retain their brilliancy and fastness. The process of applying and fixing these coal tar colors, when mixed with discharges for anilin black, is so different from that required to fix the anilin black, or said colors separately, that it has seriously interfered with the use of such colors with anilin black grounds; it being understood of course that by fixing is meant the production of what are commonly called fast pattern colors.

My present discovery relates especially to the adoption and compounding with the coal

tar colors and the discharge ingredient for the anilin black, of a metallic hydrate for the former, which when subjected to the processes which will discharge the pattern and fix the anilin black ground will also deposit the basic insoluble double salt of the metallic hydrate and color upon the fabric, and give a pattern of superior brilliancy and fastness of color.

My invention is applicable to a great variety of coal tar colors, such as alizarine yellow, orange, red, &c., or to colors compounded of two or more of these, and the aluminum may be hydrated and used in different ways. The following is one method of employing it and applying it to the cotton fiber with alizarine yellow. The metallic hydrate which I employ for this purpose is a preparation of alumina or aluminas, and I prepare it in combination with the anilin black discharge and the alizarine color in the following manner: I make solution of acetate of alumina in proportions as follows: four pounds of alumina, four pounds of white sugar of lead, one gallon of water. Dissolve and settle. Reduce the liquor to 18° Twaddle.

I make a solution of sulphocyanide of alumina as follows: three pounds sulphate of alumina, three and one-half quarts of water, four and one-eighth pounds sulphocyanide of barium. Dissolve and settle and reduce the liquor to 21° Twaddle. I take eight gallons of the above acetate of alumina, forty-eight pounds acetate of soda crystals, and twelve pounds of starch or other suitable thickening. Boil these together and cool, and add two and one-fourth gallons of alizarine orange (twenty per cent.) and one and one-half gallons of the above sulphocyanide of alumina, (21° Twaddle.)

I make an anilin black color as follows, which is practically the same color described in my Patent No. 409,822:—I make a standard of the proportions of forty-eight gallons of water; twelve pounds of starch; boil and add seventy-six pounds of yellow prussiate of soda crystals, twenty-five and three-fourths pounds of chlorate of potash. Then cool. Then I take for the black color eighteen gallons of this standard, six gallons of anilin salt liquor, formed of six pounds per gallon, of anilin

black salts dissolved in water. Mix, and then add one-fourth gallon of anilin oil. This black may be reduced with water, but the above gives a good and full fast black. I pad on one or both sides of the bleached cloth, or slop pad it in the usual way, and dry at a low temperature. I next print on this padded cloth a desired pattern with above combination of alizarine color and discharge. The printing is done with a calico printing machine and dried in the ordinary way. The cloth is next put through an aging machine heated to about 220° Fahrenheit, and with the steam mixture at 210° Fahrenheit. This develops the anilin black ground color and the alizarine color pattern at the same time.

Instead of the above degree of heat, an equivalent or even a greater degree of steam under pressure may be found advantageous with this or other alizarine, or anilin colors, as a greater percentage of the basic insoluble salts of the alumina may be found to be deposited on the fiber in this way with some brands of the color, or different colors, sold in the market than with others. The important point is to have the solution of the alumina and color so compounded that the basic insoluble double salt of the alumina and color shall not be formed in the solution, or indeed until the dialytic action of the fiber of the cotton is brought to act on it. This insures the thorough saturation of the fiber before the metallic insoluble basic salt is deposited, which in turn insures the fastness of the color, by the application of a minimum amount of heat and moisture.

Cotton yarn may be printed with my combined discharge and color solution as well as cotton cloth. The insoluble basic salt deposited in the pattern by the above process is an aluminum alizarite, with the alizarine color mentioned. The above degree of heat and moisture is what I prefer to employ, but a minimum heat of 150° Fahrenheit might be employed if applied long enough to develop the anilin black.

The above proportions of acetate of soda and of alumina and sulphocyanide of alumina are adapted to the anilin black color, compounded as described in my said previous patent, but if the proportions of the ingredients of the anilin black color are altered it will be found expedient to change the proportions of the acetate of soda and aluminas to correspond, as may be readily determined by experiment, by starting with the above known proportions. If the anilin black color used is composed of its ingredients proportioned so as to develop more rapidly than the one of my patent, or what is the same thing, as rapidly at a lower temperature, then the proportions of the ingredients of the alizarine color and discharge mixture should be so altered as to set or develop as much more rapidly, and if the anilin black color is compounded so as to require a higher heat to develop it, then

the alizarine color and discharge mixture should be changed to correspond; the essential point being that they shall develop and be fixed alike under the steaming or aging process. If preferred the alizarine color and discharge mixture may be first printed in the desired pattern on the cloth, and dried, and the anilin black be applied to the cloth afterward and dried and steamed as above described. Acetate of potash may also be used in place of acetate of soda.

The above modifications are considered as being within the scope of my invention and being the equivalents of the process and ingredients before described.

My invention is distinguished from those in which colors are fixed by albumen, because in that case they are merely held in place mechanically by the latter, and it is also distinguished from the use of certain coal tar colors mixed with an astringent vegetable mordant and an anilin black discharge, because the latter not only does not deposit a basic metallic salt but it cannot be finally fixed simultaneously with the coal tar color as a fast color at a single operation, since it is necessary to pass the fabric afterward through a salt of antimony, such as tartar emetic, before the chemical operation upon the mordant of fixing the colors by the insoluble lake is finally complete, whereas all the chemical operations in my process of depositing the insoluble basic double salt of aluminum and color are completed by the single application of steam of a predetermined temperature, or its equivalent of moisture and heat, at one operation. No subsequent application of any other substance substantially affects the fastness of the color.

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 anilin black grounds, which consists in first padding or covering the fabric or fiber with an anilin black mixture, and then printing with a color mixture consisting of an anilin black discharge, a coal tar color, and an alumina hydrate as mordant for the color, and then steaming or aging at such degree as that the anilin black and the color pattern are simultaneously developed and fixed substantially as described.

2. The color mixture for printing on anilin black grounds adapted to be developed and fixed by the same amount of heat and moisture as the anilin black, which consists of an anilin black discharge, a coal tar color, and an alumina hydrate, the insoluble salts of which have an affinity for both said color and cotton fiber, whereby said heat and moisture will cause said mixture to discharge the anilin black on the fiber, and to deposit in place thereof the insoluble double salt of the alumina and color substantially as described.

3. The color mixture for printing on anilin

black grounds adapted to be developed and
fixed by the same amount of heat and moist-
ure as the anilin black, which consists of an
anilin black discharge, an aluminum hydrate,
5 and an alizarine color, whereby said heat and
moisture will cause said mixture to discharge
the anilin black on the fiber and to deposit

in place thereof an insoluble aluminum ali-
zarate substantially as described.

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Witnesses:

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