UNITED STATES PATENT OFFICE.

WILLIAM BROWNING, OF ACCRINGTON, ENGLAND, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE ARNOLD PRINT WORKS, OF NORTH ADAMS, MASSACHUSETTS.

PROCESS OF PRINTING COLORS WITH ANILINE-BLACK.

SPECIFICATION forming part of Letters Patent No. 491,673, dated February 14, 1893.

Application filed July 30, 1892. Serial No. 441,727. (Specimens.) Patented in England June 18, 1892, No. 11,416.

To all whom it may concern:

Be it known that I, WILLIAM BROWNING, a subject of the Queen of Great Britain and Ireland, residing at Accrington, in the county of Lancaster, England, have invented an Improved Process for the Production and Fixation of Colors, in Conjunction with Aniline-Black, upon Cotton, (for which I have obtained British Letters Patent No. 11,416, dated June 18, 1892,) of which the following is a specification.

This invention relates to an improved process or combination of operations for the production and fixation of colors, in conjunction with aniline black upon cotton materials.

According to this invention, the fabric or other material is first mordanted, as by padding with a solution of an astringent matter, say, for example, tannic acid or other material possessing similar properties such as gall liquor, sumac extract, or other known astringent, which is then fixed by treatment with a solution of tartar emetic or other suitable metallic salt, according to the usual known methods of mordanting. The material thus mordanted or prepared is then washed, dried and padded either upon one side, or upon both, with an aniline black mixture thickened or otherwise, suitable for the production of aniline black by the ordinary known methods. Before, however, developing the aniline black by steaming or aging in the usual manner, the material prepared as above is printed in the desired pattern or design with coloring matters (such as those ordinarily fixed with an astringent as above) dissolved and thickened and mixed with suitable proportions of acetate of soda or such other well known materials, commonly called "resists," as are used to prevent the formation or development of aniline black upon the parts so printed. When the aniline black is developed by steaming or aging as usual, the coloring matters on the printed portions are at the same time fixed by the mordant or astringent matter and the resist in the coloring mixtures prevents the formation of the aniline black at those parts.

I do not claim as new any of the above described steps in this process when taken separately, for they have been heretofore used singly, but by combining the several operations in the manner herein described the most perfect effects can be obtained, and delicate, brilliant, and elaborate patterns or designs can be produced upon aniline-black grounds which, heretofore, has not been accomplished.

My improved process is to be distinguished from that in which colored designs have been produced in connection with aniline black grounds by reserving white portions corresponding to the design or pattern desired, and then printing and fixing the color upon such portions, in which operation the difficulty of exactly fitting the reserved white portions has been so great and, in fact, almost impossible in fine patterns, that the results have been very imperfect and unsatisfactory: it is also to be distinguished from the methods heretofore used for producing colored figures upon aniline-black grounds by fastening pigments upon the fabric, with albumen, which is a wholly mechanical method. For in these pigment methods, the range of colors which can be employed is comparatively limited besides lacking clearness, brilliancy and permanency; while by my improved process the colors are chemically fixed in the fabric, have great brilliancy, and the variety of colors and shades of colors which may be employed is unlimited.

As a specific illustration of the use of my improved process, I will describe the production of a blue pattern on an aniline black ground upon cotton cloth. First prepare or mordant the cloth in the following manner: Make two separate solutions, one in the proportion of one ounce of tannic acid dissolved in one gallon of water and the other one ounce of tartar emetic to each gallon of water. Pass the cloth through each solution separately, drying it between the two, then wash and dry. Next pad (preferably on both sides) with a solution prepared as follows:—First dissolve six pounds of chlorate of potash in six gallons of hot water, and fifteen pounds of ferro-cyanide of potash, also in six gallons of hot water, and mix the two solutions together; when cool, add six quarts of aniline oil and six quarts of hydrochloric acid (at 32° Twaddle), which have been previously mixed and cooled. This is the standard mix-

ture. When required for use, add more hydrochloric acid in the proportion of about two ounces of the acid to each gallon of the above mixture. When the cloth thus padded is dried, print on the design with the following:—Dissolve two ounces of, say, methylene blue in half a pint of methylated spirits and half a pint of hot water, and add seven pints of a thickened "resist" containing about four ounces and two-thirds of acetate of soda and two ounces and two-thirds British gum to the half pint. When dry, expose in a steam chamber in the usual way, which will develope the aniline black ground and at the same time fix the methylene blue pattern by the astringent mordant, then wash and finish in the usual manner. In this manner designs in any of the great variety of brilliant colors, derived from coal-tar may be produced upon cotton materials in conjunction with aniline black, and with a variety of different colors in each design, which heretofore has not been accomplished by calico-printers.

It will be understood that the ingredients and proportions of ingredients in the several mixtures may be varied according to the formulas employed by each calico-printer.

I claim as my invention:—

The process of producting and fixing upon cotton, designs in colors, in conjunction with aniline-black, which consists in, first, applying to the material a mordant formed by an astringent solution and a metallic salt; second, padding the material with an aniline mixture suitable for producing aniline black; third, printing upon the material in any desired designs a resist for aniline-black mixed with coloring matter which will enter into chemical combination with such mordant, and finally, steaming or aging the material so mordanted, padded and printed, to develop and fix the colors, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM BROWNING.

Witnesses:
GEORGE DAVIES,
JNO. HUGHES.

Correction in Letters Patent No. 491,673.

It is hereby certified that in Letters Patent No. 491,673, granted February 14, 1893, upon the application of William Browning, of Accrington, England, for an improvement in "Processes of Printing Colors with Aniline Black," an error appears in the printed specification requiring the following correction, viz.: In line 29, page 2, the word "producting" should read *producing;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 28th day of February, A. D. 1893.

[SEAL.]

CYRUS BUSSEY,
Assistant Secretary of the Interior.

Countersigned:
W. E. SIMONDS,
Commissioner of Patents.