

UNITED STATES PATENT OFFICE.

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PROCESS OF DYEING ANILIN-BLACK.

SPECIFICATION forming part of Letters Patent No. 570,117, dated October 27, 1896.

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To all whom it may concern:

Be it known that I, VICTOR G. BLOEDE, a citizen of the United States, and a resident of Catonsville, in the county of Baltimore and State of Maryland, have invented certain new and useful Improvements in the Dyeing and Printing of Anilin-Black upon Yarns and Textile Fabrics; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My process consists in the direct development of anilin-black upon the fiber without the intermediate process known as "aging." Heretofore the production of anilin-black has been effected by impregnating the fiber with a mixture of anilin salt and a chlorate, preferably in conjunction with some metallic salt, as fully set forth in patent to Lightfoot, No. 38,589, then drying the fabric and developing the color by the process known as "aging," which consists in exposing the material so impregnated to the action of the atmosphere for several days, or the atmosphere and steam conjointly for a shorter time, until the first stage of oxidation has been reached, evidenced by the formation of a dark-green or black color, the development of a full black being effected by a secondary oxidation, consisting in the passage of the fiber or fabric through a solution of an alkali or a chromate or bichromate of the alkali. This method is a long, tedious, and expensive one, and the object of my invention is a simplification of the process by a direct production of the color in a much shorter time and much less expensive manner, as well as with less damage to the strength of the fiber operated upon, and my invention is based upon the fact that when peroxid of hydrogen, chromic acid, hyperchlorous, or a permanganate is allowed to act upon an anilin salt in the presence of a minimum amount of water anilin-black is at once produced, and, when in conjunction with a fiber, in such condition that it adheres firmly and becomes permanently fixed.

I am aware that processes have been proposed in which chromates and other oxidizing agents are caused to act upon anilin salts

in a bath or solution, producing a direct formation of black in the bath; but all of such processes have hitherto proved impracticable and useless, owing to the fact that the color thus developed shows a stronger affinity for the water than the fiber, only fixing a small percentage of the color, and even this percentage but loosely and insufficiently, the bulk of the color being deposited in the bath instead of the fiber, thus causing a heavy loss of material as well as an unsatisfactory and "smutty" fixation.

The object of my invention is to overcome this difficulty and to produce a well-fixed black by the same direct process, yet without any loss of coloring-matter, and I accomplish this object by conducting the process of direct oxidation in the presence of a minimum quantity of water, that is, a quantity insufficient to cause a solution or withdrawal of any portion of the dye material previous to its fixation, yet sufficient to act as a vehicle for the application of the oxidizer.

Having now described the principle underlying my process, I will give an account of the manner in which I carry it out in practice.

I first prepare a solution of anilin, chlorid, or other suitable salt of this base or its homologues, containing about twenty-five per cent. by weight of the dry salt. This solution may be reinforced by the addition of chlorate of potash or soda and a metallic salt, thus conforming to the composition now generally used, or I may use a simple solution of anilin salt, the nature of the subsequent oxidation rendering it unnecessary to have chlorin or other oxidizers present in the liquor, except that in case no oxidizers are used in the composition itself a proportionately larger amount of the oxidizer must subsequently be used.

Having prepared a solution as above described, I impregnate the fiber or fabric with it by any of the usual methods of padding or printing, and having removed the excess of dye-liquor I preferably, although not necessarily, dry the goods. After this impregnation and drying I proceed with the oxidation, not by aging or steaming, as is customary

in the existing processes, but by the direct application of any powerful oxidizer in aqueous solution or gaseous form in such a manner that at no time the fabric becomes saturated or surcharged with moisture. As an oxidizer I prefer chromic acid, permanganic acid, or peroxid of hydrogen, although I do not confine myself to these, and I apply the oxidizer, not by running the anilin-impregnated cloth through a solution of these, which would entirely defeat the objects and results of my process, but apply them uniformly and in small quantities by any convenient mechanical appliance. This may be effected in a number of ways, for instance, by means of brushes kept continuously dampened with the oxidizer, or by passing the fabric through squeeze-rolls covered with felt, kept moist, but not wet, by the oxidizer, or by the use of a dampening-machine, such as is in common use for dampening fabrics, and operated by a rapidly-revolving brush or other mechanical appliance, or by passing the yarn or fabric through a chamber filled with oxidizing-vapors. As soon as the oxidizing liquid comes in contact with the anilin a reaction commences, the fiber being rapidly stained or colored to a dark-green or blackish hue, according to the strength of the oxidizers and duration of exposure.

I have found by practical experience that it is best not to use the oxidizers too strong, say in aqueous solutions containing not over ten per cent of the active agent, and not to effect the oxidation too rapidly, as this impairs the tone of the black by causing super-oxidation or burning of the color. I prefer the use of weaker liquors, and, if necessary, repeating the oxidation two or three times. I have also found it preferable to stop the oxidation at the green or primary stage, in which the materials constituting the color have already reached the insoluble condition, and completing the oxidation in a bath of alkali or bichromate in the same manner that

is in use in the old process after the goods have passed through the aging.

I am aware that chromates and other oxidizers have been used in conjunction with anilin salt for the production of anilin-black in aqueous baths or solutions, and I am also aware that anilin salts and oxidizers combined in one solution are frequently used, and I do not claim such process or combination; but

What I claim is—

1. The process of producing anilin-black on fibers or fabrics, which consists in first saturating the fiber with a salt of anilin or its homologues, then without previous aging, bringing the fiber in contact with an oxidizer applied in such quantity that the fiber or fabric will not become supercharged with moisture until the color developed has become insoluble, substantially as set forth.

2. The process of producing anilin-black on fibers or fabrics consisting in first saturating the fiber with a salt of anilin or its homologues, then drying it, then without previous aging bringing the fiber in contact with an oxidizer applied in such quantity that the fiber or fabric will not become supercharged with moisture until the color developed has become insoluble, substantially as set forth.

3. The process of producing anilin-black on fibers or fabrics, which consists in first saturating the fiber with the salt of anilin or its homologues, combined in the usual manner with chlorates or metallic salts, then without previous aging bringing the fiber in contact with an oxidizer applied in such quantity that the fiber or fabric will not become supercharged with moisture until the color developed has become insoluble, substantially as set forth.

VICTOR G. BLOEDE.

Witnesses:

WM. L. LAYFIELD,
GERTRUDE GIBSON.