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UNITED STATES PATENT OFFICE.

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PRODUCING BROWN, OLIVE, AND GREEN SHADES ON THE FIBER.

963,656.

Specification of Letters Patent.

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No Drawing.

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To all whom it may concern:

Be it known that I, HENRI SCHMID, chemist, citizen of the Swiss Republic, residing at Mülhausen, in Alsace, Germany, have invented new and useful Improvements in Producing Brown, Olive, and Green Shades on the Fiber, of which the following is a specification.

It is known that, by suitably oxidizing para-phenylene-diamin in the presence of the fiber, reddish brown shades can be obtained possessing many good qualities. It has now been discovered that in a somewhat similar manner various shades, as hereinafter explained, can be obtained by suitably oxidizing meta-amino-phenolic bodies on the fiber. For the purposes of this invention the salts of these bases are submitted to oxidation with alkali chlorate and ferrocyanid in a manner analogous to that customary when producing anilin black. If, for instance, goods treated with the hydrochloric acid salt of 1.3-amino-phenol be steamed in the presence of sodium chlorate and yellow ferrocyanid of potash and subsequently chromed or aged and washed, as in the production of anilin black, a bronze-olive shade is obtained which possesses practical value. By soaping, the shade can be rendered browner and more nearly bronze color. If shades resembling bister be desired, after steaming and chroming, or aging, the goods must be treated with an alkali, which can be done by passing the goods through a lukewarm bath containing silicate of soda, borax, soda, or the like. When the goods thus treated are soaped, a brown, with a distinct yellow shade, is obtained. Among the meta-amino-phenolic bodies which can be used, I mention meta-amino-phenol itself and the meta-amino-cresols. Para-amino-phenols and ortho-amino-phenols can also be used in conjunction with the meta-amino-phenolic bodies, and various shades can be obtained. It has further been discovered that green and olive shades can be obtained by choosing conditions which tend to increase the formation and prevent the decomposition of Prussian blue, that is, by increasing the quantity of ferrocyanid employed and the acidity and preventing the decomposition of the blue by washing, after chroming or aging, in water free from lime, or even in acidified water.

The shades obtained according to this invention can be produced using either white, or colored reserves. The shades have good fastness against the action of light and soap.

The following are examples of how my invention can be performed, but it is not confined to these examples.

Examples: Prepare a bath containing thirty grams of meta-amino-phenol, thirty cubic centimeters of thirty per cent. hydrochloric acid, thirty, to forty, grams of potassium ferrocyanid, and twenty-five grams of sodium chlorate in each liter of the bath. Or the following proportions may be taken. Twenty-five grams of meta-amino-phenol, fifty, to sixty, cubic centimeters of thirty per cent. hydrochloric acid, sixty grams of potassium ferrocyanid, and twenty-five grams of sodium chlorate in each liter of the bath. In either case, filter the solution, pad the goods with the filtered solution, and dry on the hot flue. At this stage the goods may appear white, or slightly colored. If desired, a white, or colored, reserve can be printed onto the grounded goods. The goods are steamed for about ten minutes in a Mather & Platt apparatus and treated with a lukewarm solution of sodium bichromate. To obtain a green shade, wash the goods with slightly acidified water, and dry them. To obtain a brown shade, wash the goods in water, and pass them through a bath of sodium silicate and wash and soap them. For white reserve there can be used, for instance, four hundred grams of gum sulfite (45° Bé) mixed with one hundred grams of gum solution, and one hundred grams of rongalite C. For colored reserves on cotton the ordinary albumin dyes to which alkali sulfite and acetate have been added, or basic dyes with zinc white, can be used. Upon silk, or half silk, it is sufficient to print basic dyes together with potassium sulfite and sodium acetate. In these examples the meta-amino-phenol can be replaced by other meta-amino-phenolic bodies; for instance, by either of the meta-amino-cresols ($\text{CH}_3:\text{OH}:\text{NH}_2=1:2:4$, or $1:4:2$), in which case shades which are more yellow are produced.

Now what I claim is:

1. The process of producing brown, olive, and green shades on the fiber by applying

to the material a meta-amino-phenolic body, an alkali chlorate, and a ferrocyanid, and then causing the oxidation of the meta-amino-phenolic body substantially as described.

2. The process of producing brown, olive, and green shades on the fiber by applying to the material a meta-amino-phenolic body an alkali chlorate, and a ferrocyanid, then steaming, then chroming, and finally washing the material.

3. The process of producing brown, olive, and green shades on the fiber by applying to the material a meta-amino-phenolic body, a para-amino-phenolic body, an alkali chlorate, and a ferrocyanid, then steaming, then chroming, and finally washing the material.

4. The process of producing brown shades on the fiber by applying to the material a meta-amino-phenolic body, an alkali chlorate, and a ferrocyanid, then steaming, then chroming, and finally washing the material in an alkaline bath.

5. The process of producing brown shades on the fiber by applying to the material meta-amino-phenol, para-amino-phenol, an alkali chlorate, and a ferrocyanid, then

steaming, then chroming, and finally washing the material in an alkaline bath.

6. The process of producing brown shades with discharge effects on the fiber by applying to the material a meta-amino-phenolic body, an alkali chlorate, and a ferrocyanid, then drying the material and printing it with a paste containing a reducing agent, then steaming, then chroming, and finally washing the material in an alkaline bath.

7. The process of producing brown shades with discharge effects on the fiber by applying to the material meta-amino-phenol, para-amino-phenol, an alkali chlorate, and a ferrocyanid, then drying the material and printing it with a paste containing a reducing agent, then steaming, then chroming, and finally washing the material in an alkaline bath.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HENRI SCHMID.

Witnesses:

GEO. GIFFORD,
ARNOLD ZUBER.