

# UNITED STATES PATENT OFFICE.

MAXIM SCHWARZ, OF BRAUNAU, AUSTRIA-HUNGARY.

## METHOD OF DYEING.

1,019,092.

Specification of Letters Patent.

Patented Mar. 5, 1912.

No Drawing.

Application filed August 19, 1911. Serial No. 644,958.

To all whom it may concern:

Be it known that I, MAXIM SCHWARZ, chemist, a subject of the Emperor of Austria-Hungary, residing at Braunau, Bohemia, Empire of Austria-Hungary, have invented new and useful Improvements in Methods of Dyeing, of which the following is a specification.

I have found that substantive dyestuffs possess the property of fully combining in the neutral gel form with vegetable and animal fiber, by simple steaming. The manufacture of such gels of dyestuffs according to this invention is effected by dissolving the dyestuff in water to which alkali has been added whereupon the solution is stirred in a starch gel, capable of resisting the action of alkali, such for instance as wheat starch, and causing the formation of the neutral gel form by the addition of an acid or an acid salt, preferably such a one as contains a volatile basis.

By the perfect neutralization of the dissolving alkali, the dye is brought into a form differing from that obtained by the addition of glycerin in accordance with the Justinus Mullerus process (see Lehne's *Farber-Zeitung* 1905, page 226) or in accordance with the process wherein the whole of the alkali is deposited on the fiber and holds the dyestuff in solution, so that the dyestuff becomes again partly removed from the fiber when it is washed.

The alkaline hydrosol-form of indigo in the sodium salt, hysalbinic, or protalbinic, acid (see Lehne's *Farber-Zeitung*, 1903, page 212) differs also essentially from the neutral substantive dyestuff gels, and gives dyes wanting in fastness.

I have found that neutral substantive dye gels *i. e.* bodies without diffusing power, which are therefore in such a state that they are incapable of penetrating membranes, can be absorbed by, and fixed on, vegetable and animal fibers in a manner which has not been possible by any process hitherto known, for by simply impregnating the fabric once by conducting it with the liquid between rolls pressing against each other and steaming it for a short time, a perfect and stable fixing of the dye-stuffs up to the deepest

shades is secured by using an amount of dyestuff equal to 3 per cent. or more, of the weight of the goods.

### Example.

*1st solution.*—30 grams of Pará-blue 2RX, 300 grams of hot water (between 30 and 100° C.) 5 cubic centimeters of soda lye of 41° Baumé.

*2nd solution.*—20 grams of wheat starch, 200 grams of cold water, 5 cubic centimeters of soda lye of 41° Baumé.

The two solutions are intimately mixed together and then diluted with 35 cubic centimeters of hot water of any temperature between 30 and 100° C. and finally mixed with 11.8 cubic centimeters of hydrochloric acid of 21° Baumé.

By the addition of the hydrochloric acid, (or other suitable acid such as sulfuric acid, or a salt, preferably such a one as contains a volatile base like ammonium chlorid) in amount molecularly equivalent to that of the soda lye, a neutral, and perfectly durable, gel form is secured.

The fabric to be dyed is impregnated in the so-called Foulard machine squeezed between rolls and then steamed for 2, or 3 minutes, rolled hot and left rolled for from 1 hour, to 1 hour, and, for finishing passed through a solution of diazotized paranitraniline.

With dyestuffs which are to be coupled such as diazo-indigo blue, oxy-diamin black OT, and the like, the diazotizing can be effected in the usual manner and the development be done with beta-naphthol.

With dyes such as geranin, brilliant genuine blue pure diamin blue CVR, chloramin yellow and the like, the dyed fabrics are in addition washed and soaped.

This process has considerable advantages over the hitherto known Foulard process in that there is considerable saving of dyestuff, perfect fixing of the dye-stuff, saving of steam and labor and an increase in the production capacity.

I claim:—

The within described process of dyeing on vegetable and animal fibrous material which consists in mixing an alkaline solution of

substantive dyes with starch gel, neutral-  
izing the said mixture, impregnating the  
material to be dyed with the said neutralized  
mixture containing the neutral gels of the  
5 substantive dyes and then fixing the dye  
by steaming.

In testimony whereof, I have signed my

name to this specification in the presence of  
two subscribing witnesses.

MAXIM SCHWARZ.

Witnesses:

ADOLPH FISCHER,

CHARLES J. ZAKOSTALSKY.