

UNITED STATES PATENT OFFICE.

ARTHUR WEINBERG, OF MAINKUR, ASSIGNOR TO LEOPOLD CASSELLA & CO., OF FRANKFORT-ON-THE-MAIN, GERMANY.

BLUE DYE.

SPECIFICATION forming part of Letters Patent No. 469,329, dated February 23, 1892.

Application filed July 27, 1891. Serial No. 400,867. (Specimens.) Patented in France June 12, 1891, No. 211,821.

To all whom it may concern:

Be it known that I, ARTHUR WEINBERG, a citizen of the Empire of Germany, and a resident of Mainkur, near Frankfort-on-the-Main, have invented new and useful Improvements in the Production of Blue Dye-Stuffs, of which the following is a specification.

This invention has for its object the production of blue dye-stuffs. A patent having the same object has been taken in France bearing the number 211,821, of June 12, 1891.

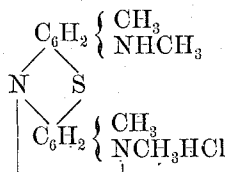
The known methods of producing thionine dye-stuffs from dimethylaniline cannot be used for the production of analogous derivatives of dimethyltoluidine, because the latter cannot be transformed into a nitroso compound.

The present specification relates to a process for obtaining the toluthianines, of which the following is an example. The new dye-stuffs are distinguished by their great intensity.

Example: 16.5 kilos of the nitrosamine of monomethyl (or ethyl) otoluidine are dissolved at about 5° centigrade in one hundred and fifty kilos of strong muriatic acid. After standing some hours the clear solution, which then contains the hydrochlorate of paranitrosomanomethyltoluidine, ($\text{NOC}_6\text{H}_4\text{NHC}_2\text{H}_5$) is diluted with water and cooled with ice. It is reduced by means of thirteen kilos of zinc-dust. As soon as the liquid has become colorless, the free mineral acid is neutralized and 24.8 kilos of thiosulphate of soda and shortly afterward ten kilos of bichromate of potash are added. Then the solution of 17.2 kilos of hydrochlorate of monomethylorthotoluidine is introduced. The oxidation is performed by

adding first one hundred and twenty kilos of chloride of zinc, and then thirty kilos of bichromate of potash. The liquid is heated to the boil. The coloring-matter is separated from the residue, which contains the chrome. It forms small green crystals. It dyes on cotton mordanted with tannic acid a pure blue.

Its chemical constitution is the following:



In this example, instead of monomethyltoluidine being used as the second component, other amines may be employed, such as otoluidine, dimethylaniline, or diethylaniline.

Having now described the nature of my invention, what I claim as new, and desire to secure by Letters Patent, is—

The new dye-stuff herein described, being a thionine derivative of secondary paratoluylenediamine, which is a dark-green crystalline powder easily soluble in water and in spirit, dissolving in alcohol with a blue color, which turns into red if caustic soda is added, and dissolving in strong sulphuric acid with a pure green shade.

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

ARTHUR WEINBERG.

Witnesses:

ALVESTO S. HOGUE,
JEAN GRUND.

It is hereby certified that in Letters Patent No. 469,329, granted February 23, 1892, upon the application of Arthur Weinberg, of Mainkur, Germany, for an improvement in "Blue Dyes," errors appear in the printed specification requiring correction as follows: In line 15 the word "dimethylotoluidine" should read *dimethylorthotoluidine*; in line 19 the word "toluthianines" should read *toluthionines*; in line 24 the word "monamethyl" should read *monomethyl*, same line the word "otoluidine" should read *orthotoluidine*; in lines 28-29 the word "paranitrosomanomethyltoluidine" should read *paranitrosomonomethyltoluidine*; in lines 54-55 the word "monomethylotoluidine" should read *monomethylorthotoluidine*; and in lines 56-57 the the word "otoluidine" should read *orthotoluidine*; and that the Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 24th day of May, A. D. 1892.

[SEAL.]

CYRUS BUSSEY,
Assistant Secretary of the Interior.

Countersigned:

N. L. FROTHINGHAM,
Acting Commissioner of Patents.