

# UNITED STATES PATENT OFFICE.

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## PROCESS OF DYEING ACID COLORS.

SPECIFICATION forming part of Letters Patent No. 711,953, dated October 28, 1902.

Application filed January 5, 1901. Renewed January 13, 1902. Serial No. 89,601. (No specimens.)

*To all whom it may concern:*

Be it known that I, CARL ENGAU, a citizen of Prussia, and a resident of Frankfort-on-the-Main, in the Province of Hesse-Nassau and Kingdom of Prussia, Germany, have invented a certain new and useful Process of Dyeing Acid Colors, with Simultaneous Fixing of Metallic Tannates, of which the following is a specification.

10 The application of acid dyeing azo colors as substitutes for logwood in wool-dyeing was hitherto difficult for some branches of the textile industry which demand the same feel and the same appearance of the goods as if  
15 dyed with logwood according to the old method. I have found that this may be attained by dyeing the wool with the addition of tannic acid to the dye-bath and then fixing the color with metallic salts—i. e., by fixing  
20 on the fiber a metallic tannate simultaneously with the respective azo dyestuff. The application of this process for technical purposes is sustained by my further observation that the black acid disazo dyestuffs can be fixed  
25 on the fiber by tannic acid with the aid of some oxalic acid. This process does not consist at all in a simple mixing of two dyestuffs on the fiber, the combination of the two known methods of dyeing black giving results which could not be anticipated. It was  
30 doubtful whether uniform dyeings could be produced, whether the goods would stand finishing processes, take up the proper luster, and whether their feel would become sufficiently strong. If the goods did not show all  
35 these properties, the object of the process to dye woolen piece goods with coal-tar colors in the style of iron-logwood-black was not obtained. These results have, however, all  
40 been actually achieved. As a special advantage it has been found, moreover, that vegetable impurities—such as particles of straw, burs, &c., which are contained in unclean qualities of wool—are even covered in dyeing  
45 according to the new process. The following example will illustrate the process:

Example: The dye-bath is charged with four per cent. naphthyl blue-black N, fifteen

per cent. sumac extract of 30° Baumé, two to three per cent. oxalic acid, calculated on the weight of the wool. The goods are entered at the boil and dyed until the bath is nearly exhausted, when three per cent. sulfate of copper and six per cent. sulfate of iron, calculated on the weight of the wool, are added. In order to completely fix the dyestuff, the goods are boiled for about three-fourths of an hour, then rinsed and dried. When dyeing subsequent lots in the old bath, sufficient oxalic acid is added to dissolve the iron tannate precipitated in the bath, and then the goods are dyed as stated previously.

This process may be employed for dyeing woolen piece goods, woolen yarn, and slubbing, as well as goods composed of wool and cotton. In the latter case the cotton is, as a rule, dyed first with suitable direct colors which are not altered in an acid-bath or which withstand cross-dyeing, and therefore offer no difficulties in the subsequent dyeing according to the previously-mentioned process. One hundred kilos, for instance, of a fabric composed of equal parts of cotton and wool are dyed with 2.5 kilos oxydiamin black SA at a temperature of 70° to 80° centigrade, with the addition of twenty kilos Glauber salt and one kilo soda per one thousand liters of liquor. The goods are then rinsed and dyed according to the recipe stated in the first example.

Having now described my invention and in what manner the same is to be performed, what I claim is—

The method of producing a perfect imitation of logwood-dyeings on wool or half-wool in feel and appearance by simultaneously fixing black naphthalene azo coloring-matters and metallic lakes of tannic acid on the fiber substantially as described.

Signed at Frankfort-on-the-Main, in the Province of Hesse-Nassau and Kingdom of Prussia, this 5th day of December, A. D. 1900.

CARL ENGAU.

Witnesses:

JEAN GRUND,  
CARL GRUND.