

# UNITED STATES PATENT OFFICE.

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## PROCESS OF DYEING HORSE-HAIR AND BRISTLES.

SPECIFICATION forming part of Letters Patent No. 301,344, dated July 1, 1884.

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*To all whom it may concern:*

Be it known that I, ALEXANDRE N. DUBOIS, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Process of Dyeing Horse-Hair and Bristles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it.

My invention relates to an improvement in the process of dyeing in black on horse-hair, bristles, goat and rabbit hairs; and it consists in the production of a very solid, brilliant, silky, and clean black by the reaction of soda on salts of lead, such as litharge dissolved in three times its weight of boiling vinegar or acetate of lead, in a bath of boiling water, as will be more fully described hereinafter.

In producing a solid black the following salts of soda can be used, viz: salts of soda, carbonate of soda, sulphate of soda, bicarbonate of soda, acetate of soda, nitrate of soda, sulphite of soda, hyposulphite of soda, and hyposulphate of soda. In increasing or diminishing the quantity of one of the above-mentioned salts I obtain different shades. If soda exceeds the salts of lead in weight, the shade obtained will be of a decided blue-black.

If, on the contrary, four parts of salts of lead and three parts of salts of soda are used, the black will be a very deep one. If four parts of salts of lead are taken and two parts of salts of soda, the black will be a greenish one. If four parts of salts of lead are taken and one part of soda, the black will be a light brownish one; but if only salts of lead are taken, and the bristles are boiled in this solution, the black will be a very light brownish one. These different shades are of very great importance in order to obtain curled hair of various hues, as may be desired for certain purposes.

In order to understand my process better, below are given four examples of how to dye, first, bristles or horse-hair to be curled; second, long bristles or horse-hair to be used for weaving purposes; third, long bristles to be mixed with curled hair; and, fourth, bristles or horse-hair the roots of which are all kept at one end, and especially adapted for the manufacture of brushes.

Suppose one thousand pounds of bristles or horse-hair which are indefinitely mixed are to be dyed. I take eight hundred gallons of boiling water and dissolve in it three per cent. of the weight of the bristle or hair of litharge or acetate of lead which has been previously dissolved in boiling vinegar. The litharge is boiled a few minutes, and then two per cent. of one of the above-mentioned salts of soda is added. This mixture is boiled about five minutes, and the bristles or horse-hair, which have been placed in suitable nets, are at once placed in the bath. Two nets, each containing about five hundred pounds, are lowered into the bath by means of a crane or other device, and then, in the course of half an hour, the temperature of the bath is raised to the boiling-point. The bristles or horse-hair are allowed to boil for one and a half hour, when the nets are removed and opened, so that the bristles or horse-hair can cool, and after washing the bristles or horse-hair in cool water they are exposed to the air or in a warm room to dry.

For long bristles or horse-hair prepared for weaving purposes and for brush-bristles, I place the bristles or hair in five baskets or perforated boxes made to fit the dyeing-boiler. The hair or bristles are placed in layers in the boxes or baskets, and between these layers of suitable thickness are placed suitable platforms or parallel sticks, so as to separate them. About two hundred pounds of the bristles or horse-hair disposed in layers are placed in each box or basket. The dyeing-bath consists of six hundred gallons of water, in which, when boiling, four per cent. of litharge or acetate of lead previously dissolved in boiling vinegar is dissolved. This mixture is allowed to boil five minutes, and then the baskets or perforated boxes containing the bristles or horse-hair are lowered into it and allowed to remain about half an hour, when the temperature is raised to the boiling-point and allowed to boil one and a half hour. The boxes or baskets containing the hair are then taken out and immediately dipped in a bath of cold water, in which they remain until the bristles in the center of the baskets or boxes are thoroughly cooled. Without this precaution fermentation would quickly take place and destroy the



black color. When the whole mass has become cool I wash it with tepid water with which there is mixed just enough carbonate of soda to soften the water. After this bath the bristles or horse-hair are ready for use.

When goat-hair is to be dyed, the proportions are about eight per cent. of salts of lead and six per cent. of salts of soda. When rabbit-hair is to be dyed, the proportions are about fourteen per cent. of salts of lead and ten per cent. of salts of soda. When the litharge is dissolved in boiling vinegar, the weight of the litharge which has been dissolved must always be calculated. By the above process I obtain a black which is extremely fast, and which resists oxalic acid, potassa, or any washing.

I do not limit myself to the proportions of the above-mentioned products, which may vary according to the greater or less strength of the products, and especially according to the natural color of the bristles. The paler the bristles the more chemicals are required, and where three per cent. would produce a

beautiful black upon dark-gray bristles or horse-hair, four per cent. would be required upon light-gray bristles, and five per cent. upon almost white bristles.

I am aware that the salts of soda and the salts of lead have heretofore been used in dyeing, and these I disclaim as broadly new.

Having thus described my invention, I claim—

The process of dyeing a black on horse-hair, bristles, goat and rabbit hair, by immersing them in a boiling bath of water containing salts of lead and salts of soda, then boiling the whole one and a half hour, then washing in cold water, and subsequently in tepid water containing sodium carbonate, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

A. N. DUBOIS.

Witnesses:

CHRISTOPHER FALLON,  
HENRY HAMILTON.