# UNITED STATES PATENT OFFICE.

HENRI KINSBOURG, OF PARIS, FRANCE, ASSIGNOR TO THE EDDYSTONE MANUFACTURING COMPANY, (LIMITED,) OF PHILADELPHIA, PA.

## IMPROVEMENT IN PROCESSES OF DYEING ANILINE-BLACK.

Specification forming part of Letters Patent No. **213,907**, dated April 1, 1879; application filed December 16, 1878.

*To all whom it may concern:*

Be it known that I, HENRI KINSBOURG, of Paris, France, but at present residing in Philadelphia, Pennsylvania, have invented a new and useful Improvement in Dyeing Vegetable Fibrous Material, of which the following is a specification:

My invention relates to the dyeing of vegetable fibrous materials black through the medium of aniline; and the object of my invention is to obtain economy and simplicity in the dyeing and the production on the materials of an indelible black, uniform in tone and free from streaks.

This object I attain by immersing the materials in a bath of water in which bichromate of potassium, an acid, and an aniline salt have been placed, in about the proportions and in the manner more fully described hereinafter.

In order that my invention may be clearly understood, I will describe a detailed example process of dyeing a fabric.

To dye, say, twenty pieces of cotton of about one thousand yards, and weighing one hundred and fifty pounds, I prepare a bath containing about six hundred gallons of water. The vessel in which the bath is made is of such a form that the materials to be dyed may be wholly immersed in the liquid. Into this quantity of water I pour about twenty pounds of bichromate of potassium and thirty pounds of sulphuric acid.

The material to be dyed, which has been previously thoroughly boiled and washed, is then immersed in the liquid, and put in motion by suitable mechanism, such as is ordinarily used in dyeing, and about twenty-five pounds of chlorhydrate of aniline are then added. The temperature of the bath should be about 10° to 15° centigrade.

The aniline being thus brought in contact with the oxidizing agent, (bichromate of potassium, or rather the chromic acid formed by the reaction of the sulphuric acid on the bichromate of potassium,) a black is formed directly on the fabric immersed in the bath.

As soon as the material has been sufficiently impregnated with the dye (usually after an immersion of three-quarters of an hour to an hour) it is removed from the bath, washed in water, and then subjected to the usual drying process.

In dyeing yarns, a smaller proportion of water may be used. Thus, for one hundred and fifty pounds of cotton yarn, four hundred gallons of water may be used, with the other ingredients in the proportions given above.

During the dyeing no precipitation takes place in the bath; but the material gradually assumes a deep-black color, and after the process is complete it will be found to have an indelible black.

After the fabric is removed from the bath, however, a black or dark-colored precipitate will be formed in the bath, and then the bath is no longer of any use; but this precipitation does not take place during the dyeing.

With a single bath I can thus dye fabrics or yarns an indelible black without the use of any previous or subsequent mordant or fixing-bath.

Although it is preferred to put the aniline in the bath after the materials under treatment have been immersed therein, this order of pouring in the ingredients is not absolutely essential.

One of the usual methods proposed of dyeing with an aniline-black is to first prepare a black coloring compound by oxidizing the aniline, and then to dissolve the product in water, so as to form a dye-bath.

Owing to the chemical reactions undergone in the preparation of this black product, the chemical nature of the original ingredients is entirely changed, and no chemical action takes place in the bath, which is black like ink, so that the bath is essentially different from one made like mine.

In my process no black is formed until it is deposited on the fibers of the material under treatment, and the bath during the dyeing process remains quite clear.

I do not claim, broadly, dyeing by means of an aniline salt with an oxidizing agent; but

I claim as my invention—

The within-described process of dyeing vegetable fibrous materials black at low temperatures, by immersing said materials in a bath

of water containing bichromate of potassium, sulphuric acid, and chlorhydrate of aniline, in the proportion of about twenty pounds of bichromate and thirty pounds of acid to twenty pounds of chlorhydrate of aniline and four hundred to six hundred gallons of water, all substantially as set forth.

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

HENRI KINSBOURG.

Witnesses:

ALEX. PATTERSON,

HARRY SMITH.