

UNITED STATES PATENT OFFICE.

LORENZO SCALA, OF GENOVA, ITALY.

IMPROVEMENT IN DYEING WITH INDIGO.

Specification forming part of Letters Patent No. 129,753, dated July 23, 1872.

To all to whom it may concern:

Be it known that I, LORENZO SCALA, of Genova, in the Kingdom of Italy, at present residing at 21 Clerkenwell Green, in the county of Middlesex, England, a subject of the King of Italy, have invented or discovered new and useful Improvements in Dyeing when Indigo is employed; and I, the said LORENZO SCALA, do hereby declare the nature of the said invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement thereof—that is to say:

The object of this invention is to obtain bright and fast blues on wool, cloth, linen, cotton, and yarns, with a considerable saving of indigo. For this purpose I employ materials of very little value, forming a solid body of dye, resisting alkalis and acids, and which, topped with indigo, acquires an unalterable fastness of color.

My principle may be applied in different ways, which I will designate by the letters A, B, and C, respectively; the two first are for wool and cloth; the third for linen, cotton, and yarns.

Process A produces a violet blue, with fine bloom and great brilliancy, and this process I conduct in the following manner, namely: Into a suitable recipient containing water at a temperature of twenty to thirty degrees C. I put annatto, which is prepared as hereinafter described. I use a larger or smaller quantity, according to the hue I wish to obtain. I then immerse the wool or cloth. In case a light blue is desired I bring it to a deep Nankin color, while if I wish to obtain a dark blue I bring it to the color of orange-peel. This operation occupies about ten minutes, and the heat of the bath is during this time raised to seventy or eighty degrees without causing it to boil. I then take out the wool or cloth, wash the same in cold water, and transfer it to another bath of the temperature of forty degrees, composed of from six to eight pounds of archil-liquor blue and a tumbler half full of sulphuric acid for every one hundred pounds of cloth or wool. In this bath I work the cloth or wool for another ten minutes to produce an even color on the material, after which I cause the bath to boil for a quarter of an hour, the material remaining in the whole time. I then take out the material and well wash it, and I

then pass it over to the vat containing the indigo prepared for dyeing blue. These baths can be frequently reused without changing them, only adding from time to time more of the coloring materials and sulphuric acid. I can apply the same process also in one bath only, mixing the whole ingredients together; but the result obtained is less body and less brilliancy of color.

Process B is for a blue blue, such as is required for the army, navy, and the trade, and which is proof against all the usual tests. This hue I produce with annatto worked in precisely the same way as detailed with regard to the first bath in process A; but for obtaining more body and brilliancy of color I add three to four pounds of madder, or four to six pounds of red sander, or four to six pounds of catechu or terra-japonica black for every one hundred pounds of material to be dyed; but the catechu or terra-japonica I boil separately and leave standing, to deposit a sediment; after which I take the clear liquid and put into the bath, leaving the sediment. Each of these three ingredients produces a similar result, but they should be used separately. When this operation is complete the material is taken to the indigo-vat.

Process C is suitable for cotton and linen. For this preparation I employ annatto, archil-liquor, blue or red, and sulphuric acid, mixed together. With regard to the quantities, I act in the same way as in the case of wool, as above, using smaller or greater quantities, according to the hue I desire to obtain; and after raising the bath to about forty degrees of heat I dip the cotton or linen therein and turn it about in the bath, (I give it seven turns or rounds;) then, after well wringing, I transfer the material to another bath of cold water slightly acidulated with sulphuric acid, wherein I put for each one hundred pounds of material to be dyed about a gallon of a clear solution of copperas green prepared as hereinafter described. I turn the material about in this bath, (giving it five turns or rounds,) after which I pass it over to the indigo-vat. For blues of a light hue the first bath is sufficient. If the indigo-vats are prepared cold I save washing the materials; but if they are prepared hot, then I wash in running or flowing water.

The preparation of annotto which I employ is obtained in the following manner: For about twenty gallons of water I employ ten pounds of annotto. I dissolve it by means of hot water and pass it through a sieve; then I add thereto eight pounds of potash; I mix or stir the bath and cause it to boil hard for three minutes, after which I put it into a recipient to cool, and when I want to make use thereof I stir the bath.

The solution of copperas green I prepare in the following manner: I mix together one pound of nitric acid, pure and concentrated; four pounds of copperas green, purified and dry; and three ounces of iron rust, dry and pulverized. I prepare these solutions in a glazed earthen pot, and begin in the morning by dissolving the copperas green a little at a time and mixing with it the iron rust. I let it stand the whole night, and the next day I put in the same pot from seven to eight gallons of boiling water. I stir the bath well and let it stand and cool. I use only the clear liquid portion.

By this invention the following great advantages are obtained: First, a great saving in the quantity of indigo. Second, an inferior quality of indigo can now be used, producing as good a color as can be obtained by the use of the first quality, which will cause a further

saving in the cost of indigo. Third, a saving of labor, as by this process less time is required to dye the materials. Fourth, the color of the articles dyed by this process is sound and unalterable—resists chemical trials. Fifth, the wool can be used as soon as it is dyed, as by this process the blue produced is so sound that it will not alter its shade in working it. Sixth, it is also applicable as a preparation for black cloth and woolen of every description, and the black obtained by this process is the best that can be desired. Seventh, it is also applicable as a preparation for green dye. Eighth, the processes are so adapted as to agree with the present system of dyeing, and will not require any alteration on the existing indigo-blue dye apparatus.

What I claim is—

1. The use, in dyeing, of annotto and indigo, substantially as herein described.
2. I also claim the means, substantially as herein described, of dyeing when indigo is employed.

LORENZO SCALA.

Witnesses:

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