UNITED STATES PATENT OFFICE.

HENRI N. F. SCHAEFFER, OF LOWELL, MASSACHUSETTS.

SOLUBLE ALIZARIN BLUE.

SPECIFICATION forming part of Letters Patent No. 527,457, dated October 16, 1894.

Application filed January 9, 1893. Renewed December 2, 1893. Serial No. 492,644. (No specimens.)

To all whom it may concern:

Be it known that I, HENRI N. F. SCHAEFFER, of Belfort, Haut-Rhein, France, but now residing in Lowell, county of Middlesex, and State of Massachusetts, have invented an Improvement in Soluble Alizarin Derivatives and Methods of Making the Same, of which the following description is a specification.

This invention relates to soluble derivatives of alizarin and to a novel method for making the same, whereby the said derivatives are rendered soluble, and especially adapted to be used in dyeing processes which require a substantially high heat to effect the reaction between the coloring matter and the mordant, such as is required in dyeing wool.

My present invention relates more particularly to a production of soluble modifications of nitro-alizarin, alizarin-blue, alizarin-yellow and like derivatives of alizarin, which bodies are normally insoluble.

Prior to my present invention, I am not aware that a soluble modification of nitro-alizarin has been produced, but prior to my present invention, I am aware that a soluble modification of alizarin-blue has been made by means of bi-sulphite of soda, as described in United States Patent No. 258,530, dated May 23, 1882, but such soluble modification of alizarin-blue has been found to be defective for dyeing wool, owing to the fact, that when the temperature of the dye-bath has been raised to boiling point, which is necessary to effect the formation of the lake in the wool, the compound of the bi-sulphite with the alizarin-blue is more or less decomposed by the high heat due to the boiling, and a portion of the alizarin-blue is again rendered insoluble, and as a result, the insoluble alizarin-blue is precipitated to the bottom of the vat, or it combines in part with the mordant on the outside or surface of the wool, and consequently, a lake is formed on the outside of the wool, which is mechanically held to the wool, and in practice, a lake, thus formed, rubs off or crocks.

My present invention has for its object to provide a soluble modification of the insoluble alizarin derivatives, which are unaffected by a substantially high temperature, such as the boiling point of water, and which are capable of dyeing wool without danger of the color crocking or rubbing off, and which are fast to light and soap and possess all the good properties of the insoluble colors and none of the bad properties, and which may be entirely utilized in the dyeing process.

The soluble alizarin-blue made by means of the bi-sulphite process, as described in United States patent referred to, possesses the objectionable features above set forth, by reason of the fact that the bi-sulphite compound of alizarin-blue and like compounds are stable when cold, but unstable when subjected to a substantially high temperature, as for instance, when subjected to 100° centigrade or the boiling point of water.

By experiment, I have ascertained that a soluble compound or modification of an insoluble alizarin derivative, which is stable under substantially high temperatures and which when boiled is not decomposed by heat, may be produced by heating the insoluble alizarin derivative, such as alizarin blue, and boracic acid in dry form and then adding an alkali to this mixture.

In order that my invention may be more clearly comprehended, I will describe the method preferred by me for making the soluble alizarin derivative, and for sake of illustration, I will describe the method of making a soluble alizarin-blue, which is unaffected by substantially high temperatures, and which is capable of dyeing wool without the objectionable features attending the method of dyeing with bi-sulphite soluble modifications of alizarin-blue.

In accordance with my invention, the alizarin derivative or alizarin-blue is first rendered anhydrous, and is then mixed with dry or chrystallized boracic acid in proportions of about one part coloring matter or anhydrous alizarin-blue, and two parts dry boracic acid. This mixture is then heated in a vessel until a fusion is effected, that is, until the dry boracic acid melts, and when melted, the mixture is allowed to cool. The cooled mass, thus formed, is then preferably ground to a substantially fine powder and heated. An alkali is then added to the heated mass to form a thick paste, which hardens in cooling, and when cooled, is reduced to powdered form, which is perfectly soluble in water and more quickly soluble in boiling water, with a

pure indigo shade. The soluble modification of alizarin-blue, thus produced, dyes wool with the usual mordants, as for instance chrome, and the coloring matter is chemically combined with the mordant, and when subjected to the boiling process to effect the combination between the coloring matter and the mordant, the soluble modification of the alizarin-blue is not decomposed or split off, but remains in solution until combined with the mordant, and consequently, the color or lake, thus produced, does not rub off or crock, and is fast to light and soap and possesses all the good properties of the insoluble alizarin-blue.

By reason of the stability of my improved soluble modification of the alizarin derivatives, they are not decomposed when boiled, and consequently, in dyeing wool, the alizarin derivative is not precipitated but remains in solution and is thoroughly used up, as the coloring matter combines with the mordant.

By means of my improved soluble modification of the alizarin derivatives, a very material saving in the amount of coloring matter employed is effected in wool dyeing, and in addition, the objectionable feature of crocking or rubbing off of the coloring matter on the wool is entirely avoided.

I have described the manner of making a soluble modification of alizarin-blue, but I do not desire to limit my invention in this respect as a soluble modification of nitro-alizarin may be made in the same manner, and also a soluble modification of other insoluble derivatives of alizarin, such for instance as alizarin-yellow, may be made. Furthermore, I do not desire to limit myself to the exact proportions mentioned, as the same may be varied, as for instance, in making a soluble nitro-alizarin, I find that substantially one-half of the quantity of dry boracic acid will suffice.

I claim—

1. The method of making soluble modifications of insoluble alizarin derivatives, which consists in heating an insoluble alizarin derivative and boracic acid in dry form and adding to the mixture thus formed an alkali, substantially as described.

2. The method of making a soluble modification of insoluble alizarin blue, which consists in heating insoluble alizarin blue and boracic acid in dry form and adding to the mixture thus formed, an alkali, substantially as described,

3. As a new article of manufacture, an alizarin derivative soluble in water, derived from an insoluble alizarin in derivative, boracic acid and an alkali having the following characteristics, viz:—soluble in water, not decomposed by boiling, and capable of being used in wool-dyeing without precipitation of the insoluble alizarin derivative, substantially as described.

4. As a new article of manufacture, a soluble alizarin blue derived from insoluble alizarin blue, boracic acid and an alkali and having the following characteristics, viz:—soluble in water, stable when heated and not decomposed by boiling, capable of dyeing wool without precipitation of the insoluble alizarin blue, and dyeing a pure indigo shade, fast to light and soap, substantially as described.

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

HENRI N. F. SCHAEFFER.

Witnesses:

JAS. H. CHURCHILL,

J. MURPHY.

Correction in Letters Patent No. 527,457.

It is hereby certified that in Letters Patent No. 527,457, granted October 16, 1894, upon the application of Henri N. F. Schaeffer, of Lowell, Massachusetts, for an improvement in "Soluble Alizarin Blue," an error appears in the printed specification requiring the following correction: In line 59, page 2, the word "in" should be stricken out; and that the Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 13th day of November, A. D. 1894.

[SEAL.]

JNO. M. REYNOLDS,
Assistant Secretary of the Interior.

Countersigned:

JOHN S. SEYMOUR,
Commissioner of Patents.