UNITED STATES PATENT OFFICE.

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SOLUBLE COLOR COMPOUND.

1,228,089. Specification of Letters Patent. Patented May 29, 1917.

No Drawing. Application filed July 6, 1914. Serial No. 849,116.

To all whom it may concern:

Be it known that we, WILLIAM BECKERS, a doctor of philosophy, and ISAAC DREYFUS, a doctor of philosophy, both citizens of the United States, and residents of the borough of Brooklyn, in the county of Kings, city and State of New York, have invented certain new and useful Improvements in Soluble Color Compounds, of which the following is a specification.

The object of our invention is a method for the production of new, novel and useful chromium compounds of mordant colors and the results produced thereby.

The usefulness of the mordant colors in dyeing depends upon the formation of a compound with an alkali metal in or upon the textile fiber. As these compounds are insoluble, considerable difficulty is experienced in causing them to thoroughly penetrate the fiber or to be so affixed to the surface of the fiber as not to rub off.

If a solution of a chromium compound is mixed with a solution of a mordant color such as logwood, alizarin blue pastes, etc., at the boil, that is, under the conditions of practical dyeing, a heavy insoluble precipitate of the chromium compound of the mordant color is at once formed. This lake has no dyeing properties and its presence in the dye bath is very objectionable as it affixes itself to the exterior of the fiber, causing rubbing or smutting when the goods are dried. As the formation of this compound is necessary in the dyeing of the color it is evident that it must not be formed in the dyeing solution but in or upon the fiber itself.

The method usually employed in the use of these mordant colors is to treat the fiber first with either a solution of a lake forming compound, such as potassium bichromate and then with a solution of the mordant color, or, to reverse the steps, treating the fiber first with a solution of the mordant color and then with the lake forming compound solution, the operations being conducted in the presence of a reducing agent, such as tartar, etc.

It is evident that the greatest care must be employed in the successful application of these methods and that considerable time and labor are occasioned by their use, and the various operations required have a tendency to weaken and harden the fiber.

The ideal method of dyeing these mordant colors upon textile fibers would be the production of their chromium compounds in a condition in which it is perfectly soluble in the dye bath, the thorough penetration of the fiber with this solution, and the precipitation of the lake within the fiber. Such a method would reduce the number of steps in the dyeing operation and therefore reduce the possibility of tendering and hardening the fiber, cause economy of time, labor and expense, and produce results far superior to those produced by the older dyeing methods.

Our present invention relates to a method whereby chromium compounds of mordant colors can be formed in a condition in which they are prefectly soluble in aqueous solution and remain unprecipitated even upon the addition of alkalis, or by boiling.

We have found that if a solution of a mordant color be added to a solution of the chromium compound formed by heating glucose and certain chromium salts, for example, the neutral chromates of the alkali-metals, there results a chromium compound of the color which is perfectly soluble in water, or in water containing an alkali or acid, even at the boiling temperature.

When a textile fiber, for example, wool, is introduced into this solution it can be thoroughly and completely penetrated by the chromium compound thus produced.

The following example represents one method of following our invention: Dissolve 108 pounds glucose in 216 pounds water and gradually add 55 pounds neutral chromate of sodium with constant stirring, maintaining a temperature of 80° to 90° C. Heat until the presence of chromic acid cannot be detected by an acidulated solution of potassium iodid. The whole operation generally requires from three to six hours. Introduce acetic acid, which requires about 20 pounds acetic acid 70%, to neutralize the free alkali formed. To the solution of the chromium compound thus formed, add a solution of 2100 pounds alizarin blue 20% paste in sufficient water, with constant stirring. The resulting clear solution of the chromium compound of the alizarin blue may be used directly in the dye bath with the addition of the proper dyeing ingredients, such as acetic acid or sulfuric acid.

This above mentioned solution of the

chromium compound of the alizarin blue may be evaporated to dryness, in which case it is advisable to add a small amount of an alkaline compound to render the solution alkaline. The dry color compound thus produced is soluble in water and may be employed in the same manner as the original solution before evaporation.

We do not limit ourselves to the particular ingredients, the quantities, times or temperatures mentioned above, nor to the particular order of the incorporation of the ingredients, all of which may be varied without going beyond the scope of our invention as described and claimed.

What is claimed, is:

1. The process of producing a compound of a mordant color soluble in water, alkaline water and acidulated water which comprises dissolving a neutral chromium alkali-metal compound in glucose, heating until no chromic acid is shown by testing with potassium iodid, and adding a solution of a mordant color.

2. The process of producing a compound of a mordant color soluble in water, akaline water and acidulated water which comprises dissolving a neutral chromate of sodium in glucose, heating until no chromic acid is shown by testing with potassium iodid, and adding a solution of a mordant color.

3. The process of dissolving a neutral chromate of an alkali-metal compound in glucose, heating until there is no chromic acid present, and adding a solution of a mordant color.

4. The process of dissolving neutral chromate of sodium in glucose, heating until there is no chromic acid present, and adding a solution of a mordant color.

5. The process of producing a compound of a mordant color soluble in water, alkaline water and acidulated water comprising heating glucose and a chromium compound together in solution producing a solution of a chromium compound not precipitatable by alkalis or mordant colors, and adding the solution of a mordant color.

6. The process of producing a compound of a mordant color soluble in water, alkaline water and acidulated water comprising heating glucose and neutral chromate of an alkali-metal together in solution producing a solution of a chromium compound not precipitatable by alkalis or mordant colors, adding a solution of a mordant color, and evaporating to dryness.

7. The process of producing a compound of a mordant color soluble in water, alkaline water and acidulated water comprising heating glucose and a neutral chromate of an alkali-metal together in solution producing a solution of a chromium compound not precipitatable by alkalis or mordant colors, adding a solution of a mordant color, adding an alkaline compound and evaporating to dryness.

8. The process of producing a compound of a mordant color soluble in water, alkaline water and acidulated water comprising heating glucose and neutral chromate of sodium together in solution producing a solution of a chromium compound not precipitatable by alkalis or mordant colors, adding a solution of a mordant color, and evaporating to dryness.

9. The process of producing a compound of a mordant color soluble in water, alkaline water and acidulated water comprising heating glucose and neutral chromate of sodium together in solution producing a solution of a chromium compound not precipitatable by alkalis or mordant colors, adding a solution of a mordant color, adding an alkaline compound and evaporating to dryness.

10. As a new article of manufacture, a compound of a mordant color soluble in water, alkaline water and acidulated water producible by treating glucose and a chromium compound from the aqueous solution of which the produced chromium compound is not precipitatable by alkalis or mordant colors, and adding a solution of a mordant color.

11. As a new article of manufacture, a compound of a mordant color in dry powdered form soluble in water, alkaline water and acidulated water producible by adding neutral chromate of an alkali-metal to a solution of glucose, heating until the aqueous solution of the thus produced chromium compound is not precipitatable by alkalis or mordant colors, adding a solution of a mordant color, and evaporating to dryness.

12. As a new article of manufacture, a compound of a mordant color in a dry powdered form soluble in water, alkaline water and acidulated water producible by adding a neutral chromate of sodium to a solution of glucose, heating until the aqueous solution of the produced chromium compound is not precipitatable by alkalis or mordant colors, adding a solution of a mordant color, and evaporating to dryness.

13. As a new article of manufacture, a compound of a mordant color in dry powdered form soluble in water, alkaline water and acidulated water producible by adding neutral chromate of an alkali-metal to a solution of glucose, heating until the aqueous solution of the thus produced chromium compound is not precipitatable by alkalis or mordant colors, adding a solution of a mordant color, adding an alkaline compound and evaporating to dryness.

14. As a new article of manufacture, a compound of a mordant color in a dry powdered form soluble in water, alkaline water and acidulated water producible by adding a neutral chromate of sodium to a solution of

glucose, heating until the aqueous solution of the produced chromium compound is not precipitatable by alkalis or mordant colors, adding a solution of a mordant color, adding an alkaline compound and evaporating to dryness.

Signed at the borough of Brooklyn, in the county of Kings, city and State of New York, this 25 day of March, 1914.

WILLIAM BECKERS.
ISAAC DREYFUS.

Witnesses:
FELIX GOBSLACH,
WM. T. MILLER.