UNITED STATES PATENT OFFICE.

HEINRICH AUGUST BERNTHSEN, OF MANNHEIM, AND PAUL JULIUS, OF LUDWIGSHAFEN, ASSIGNORS TO THE BADISCHE ANILIN AND SODA FABRIK, OF LUDWIGSHAFEN, GERMANY.

SUBSTANTIVE VIOLET DYE.

SPECIFICATION forming part of Letters Patent No. 521,096, dated June 5, 1894.

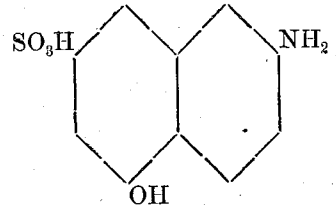
Application filed March 30, 1894. Serial No. 505,740. (Specimens.) Patented in Germany January 9, 1893, No. 75,469; in England February 6, 1893, No. 2,614, and in France May 15, 1893, No. 227,892.

To all whom it may concern:

Be it known that we, HEINRICH AUGUST BERNTHSEN, a subject of the King of Prussia, residing at Mannheim, in the Grand Duchy of Baden, and PAUL JULIUS, a subject of the Emperor of Austria-Hungary, residing at Ludwigshafen, in the Kingdom of Bavaria, Empire of Germany, have invented new and useful Improvements in the Manufacture of a New Substantive Violet Dye, (for which patents have been obtained in Germany, No. 75,469, dated January 9, 1893; in England, No. 2,614, dated February 6, 1893, and in France, No. 227,892, dated May 15, 1893,) of which the following is a specification.

Our invention relates to the manufacture of a new violet dye which fixes itself on cotton goods and the like from a boiling neutral or alkaline bath without the aid of a mordant.

Our new dye derives from a new amido-napthol-sulfoacid, which we have invented and which is obtained by melting with a caustic alkali the 2—4′—2′—naphthylamindisulfoacid (Armstrong and Wynne, *Proceedings of the Chemical Society*, 1890, page 128) at a temperature of about 170° to 195° centigrade as more fully described in the French patent, No. 227,892, of February 13, 1893. This new acid has the constitution represented by the formula:



and the new dye is obtained by combining two molecular proportions thereof with one molecular proportion of tetrazo-diphenyl in the presence of an alkali.

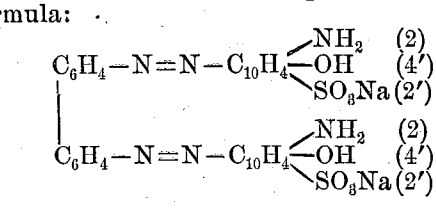
Our new dye possesses a high technical value on account of its great affinity for vegetable fiber and the fastness of the shades it yields, resisting well the action of acids and alkalies and of light. Moreover we have discovered that it can be diazotized on the fiber by treating the goods dyed with it with nitrous acid and that the resulting compound will then combine with other dyestuff-components yielding various very fast shades of color. The components which can be used in this way are for instance the naphthols, resorcinol, meta-phenylene- and toluylene-diamin, ethyl-beta-naphthyl-amin, alpha-amido-beta-naphthol-ether, para-amido-diphenyl-amin and chrysoidin.

The following example will serve to illustrate the manner in which our invention can be carried into practical effect and our new dye obtained. The parts are by weight.

Example: Prepare a solution of tetrazo-diphenyl from about eighteen and a half parts of benzidin in the well-known way and pour the tetrazo-solution into an ice-cold dilute soda-solution, and then immediately add a solution of about forty eight parts of the new amido-naphthol-mono-sulfoacid. Stir for about twelve hours, filter, press and dry.

Our new dyestuff occurs as a dark powder readily soluble in both hot and cold water giving claret-red solutions, it is slightly soluble in alcohol, practically insoluble in benzene, ether and ligroïne, it gives a beautiful blue solution in concentrated sulfuric acid and on diazotizing on the fiber the latter assumes a grayish-greenish color changing on treatment with the components hereinbefore mentioned to beautiful and exceedingly fast deep shades.

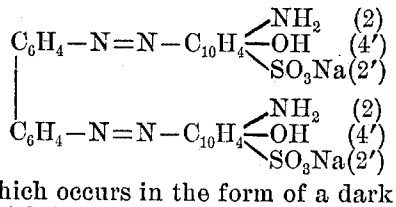
The new dyestuff in the form of soda salt possesses the constitution represented by the formula:



Now what we claim as new, and desire to secure by Letters Patent, is—

As a new article of manufacture the new coloring-matter which can be derived from

tetrazo-diphenyl and the 2.4'.2'—amidonaphthol-sulfoacid and in the form of soda salt possesses the constitution:



and which occurs in the form of a dark powder which is readily soluble in hot and cold water giving claret red solutions, slightly soluble in alcohol, practicably insoluble in benzene, ether and ligroïne, soluble in sulfuric acid giving a beautiful blue solution, and which on diazotizing on the fiber assumes a grayish-green color all substantially as hereinbefore described.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

HEINRICH AUGUST BERNTHSEN.
PAUL JULIUS.

Witnesses:
ERNEST F. EHRHARDT,
ADOLPH REUTLINGER.