

UNITED STATES PATENT OFFICE.

BERTRAND S. SUMMERS, OF PORT HURON, MICHIGAN, ASSIGNOR TO SUMMERS LINEN COMPANY, A CORPORATION OF MAINE.

ART OF DYEING.

1,064,393.

Specification of Letters Patent.

Patented June 10, 1913.

No Drawing.

Application filed November 7, 1910. Serial No. 591,010.

To all whom it may concern:

Be it known that I, BERTRAND S. SUMMERS, a citizen of the United States, residing at Port Huron, in the county of St. Clair and State of Michigan, have invented certain new and useful Improvements in the Art of Dyeing, of which the following is a specification.

My invention relates more particularly to that class of dyes derived from anthracene or synthetic indigo, commonly known in the art as vat dyes. It is the usual practice with dyes of this class to render them soluble by a reducing agent and while in the reduced state deposit them upon the fiber. The dye is subsequently re-oxidized which gives the permanent color toward washing and light characteristic of these dyes. It is customary to prepare such dyes for use by dissolving them in an alkaline bath containing either caustic soda or carbonate of soda or both, also hydrosulfite of soda, the last named serving as the reducing agent. The bath prepared in this way, however, is not entirely satisfactory although the solution of the dye is substantially complete, for the reason that the dye deposits so rapidly on the fiber that an even shade is very difficult to obtain. And this is particularly true of material such as mercerized yarns having a base of hydro-cellulose though it is true in greater or less degree of all vegetable fibers especially where they have been previously submitted to strong alkalis, and the difficulty is especially pronounced in machine dyeing, so much so that the use of dye stuffs of this class is greatly reduced where the machine process is employed. I have discovered that if the alkali heretofore employed be replaced by sulfid of soda in the reducing bath and the latter employed with the usual hydro-sulfite the objection above noted is obviated and not only is the material dyed an even shade but less hydrosulfite and dye are required and the dyeing operation is therefore more economical. I wish to emphasize the fact that in my process the hydrosulfite of soda remains the reducing agent and the sulfid of soda replaces the alkaline reagents heretofore used for it is old in this art and in connection with certain of these dyes to employ sulfid of soda as the reducing agent in place of the hydrosulfite generally used but the last mentioned

process is not entirely satisfactory since it is not so fast and the shade produced is dull. Where, however, hydrosulfite is the reducing agent as in my process, these difficulties do not appear. In carrying out my invention the quantity of solution and the proportions employed depend on the particular method of dyeing practised; for example, for machine dyeing I employ ten pounds of crystals of sulfid of soda to one hundred gallons of solution, and hydrosulfite of soda to the extent of from one per cent. to one and a half per cent. of the weight of the material to be treated. Again, if open vat dyeing is employed the proportion of hydrosulfite is somewhat increased.

The dyeing operation when my process is employed is extremely simple. When an open vat is used the solution is made by introducing the sulfid of soda and hydrosulfite of soda in the proportions stated above into a vat containing water to the amount of from fifteen to twenty times the weight of the material to be dyed. Of course in the machine process the amount of solution required is less, usually from five to six times the weight of the material to be treated. Before the dye is introduced the bath must be brought to the proper temperature for the particular dye employed, which temperatures, however, are well known to dyers and need not be here specified, and after the dye has been put in, the bath must be stirred at intervals until the dye is thoroughly reduced and dissolved. In the case of the open vat treatment the material to be dyed is simply put into the vat but in the machine treatment the solution is usually let in on to the material to be dyed. The dyeing operation in either case may be conducted in the usual or approved manner and is generally completed in about forty minutes.

It will be obvious that the precise quantities which I have given for illustration only may be somewhat varied as well as the steps of the dyeing operation which I have described, without departing from my invention which is defined in the following claims.

What I claim is:

1. The method of dyeing with non-sulfurized vat dyes, which consists in dissolving the dye in a solution containing a solu-

105

ble sulfid and a reducing agent, and then treating the material to be dyed with said solution.

2. The method of dyeing with non-sulfurized vat dyes, which consists in dissolving the dye in a solution containing sulfid of sodium and a reducing agent, and then treating the material to be dyed with said solution.

10 3. The method of dyeing with non-sulfurized vat dyes, which consists in dissolving the dye in a solution containing sulfid of sodium and hydrosulfite of soda, and then treating the material to be dyed with said
15 solution.

4. A bath for dyeing with non-sulfurized vat dyes consisting of a solution of a soluble sulfid, a reducing agent and a vat dye.

5. A bath for dyeing consisting of a solution of sulfid of soda, a reducing agent and a non-sulfurized vat dye.

6. A bath for dyeing consisting of a solution of sulfid of soda, hydrosulfite of soda and a non-sulfurized vat dye.

BERTRAND S. SUMMERS.

Witnesses:

D. MacTAGGART,
J. D. PATTUNIS.