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UNITED STATES PATENT OFFICE.

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PROCESS FOR PRODUCING RESISTS ON ANIMAL FIBERS.

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Two-colored effects may be produced on union fabrics containing animal and vegetable fibers,—e. g., fabrics consisting of mixtures of wool and cotton, or of silk and cotton,—by using tannin in combination with tartar emetic. The treatment with tannin and tartar emetic requires the use of two substances which produce a reciprocal effect on the animal fiber of the union fabric in such a manner that the tannin is fixed on the fiber by means of the tartar emetic.

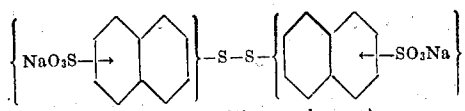
Now we have found that the resist action on the animal fibers of union fabrics, such as that produced by the combined action of tannin and tartar emetic, can be obtained by substituting for the said reserving means aromatic sulfonic acid compounds the aromatic residues of which are connected with any residues,—which may also be sulfonated,—by bridging atoms in the form of bivalent metalloids. The expression aromatic residues also comprises partially hydrated aromatic compounds. As bridging atoms may serve oxygen or sulfur atoms.

The said sulfonic acids, advantageously in the form of their salts, are to be added to the neutral dye-bath after the animal fiber, e. g. (wool) of the union fabric has been selectively dyed with the acid dyestuff, and simultaneously with the dyestuff for selectively dyeing the vegetable fiber of said union fabric, without there being any necessity for taking special steps for the fixation on the animal fiber of the products dissolved in water. This peculiar reserving property of the sulfonic acid-salts, which are simply dissolved in the dye-liquor in the absence of any special means for the fixation, can scarcely be explained by the tanning property which the free sulfonic acids mostly possess only in a slight degree or not at all. Indeed, as is known, even the sulfonic acids of the kind in question which possess a very good tanning property, such as the sulfonic acid from methylidene dicresylether do not precipitate in a neutralized form solutions of gelatine, nor are they capable of transforming hides into leather. The action of the various sulfonic acids of the above-mentioned classes as regards their resist effect is in no way equally strong. It varies largely but it is in many cases stronger than that of tannin and tartar emetic.

Among the named products those which are, for instance, obtained from hydrocarbon sulfonic acids by condensing them for instance with sulfur halide, have proved to be particularly suitable for the purpose in question; furthermore, sulfonic acids of methylidene dicresylether and homologues thereof; also, the products obtainable by a strong oxidation of resinous bodies from phenol and sulfur chloride or from sulfurized phenols, the alkali salts of which products possess more or less the property of not being precipitated by strong acids; finally, the sulfonic acids obtainable from benzylchloride sulfonic acid and phenol alkali or alkali salts of phenolic resins.

The following examples serve to illustrate our invention:

Example 1.—100 kg. of a union fabric of wool and cotton are treated for one hour at the boil in a dyebath containing 2 kg. of naphthol yellow S E L, 10 kg. of crystallized Glauber's salt and 4 kg. of sulfuric acid. Only the wool fibers of the union fabrics are dyed in said dyebath. The union fabric is then rinsed with water and treated, at 50-60° C., in a fresh dyebath containing 2 kg. of dianil pure blue P. H., 3 kg. of sodium thiodinaphthylsulfonate and 20 kg. of crystallized Glauber's salt. As a result of the latter treatment the cotton fibers of the union fabric are selectively dyed, the wool fibers being reserved by the action of the sodium thiodinaphthylsulfonate. The said sodium thiodinaphthylsulfonate is obtained by causing 250 kg. of naphthalene to react with 300 kg. of concentrated sulfuric acid and 103 kg. of sulfur dichloride in the heat and subsequently neutralizing. It has most probably the formula:



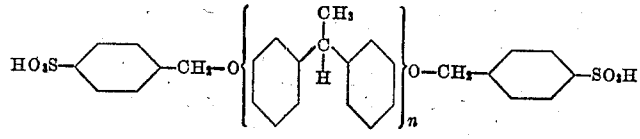
(occupied positions unknown)

Example 2.—100 kg. of a union fabric of

wool and cotton are treated for one hour at the boil in a dyebath containing 2 kg. of aminonaphthol red B B, 10 kg. of crystallized Glauber's salt and 4 kg. of sulfuric acid. Only the wool fibers of the union fabric are dyed in said dyebath. The fabric, after rinsing, is then treated, at 50–60° C., in a fresh dyebath containing 2 kg. of dianil green B B N, 20 kg. of Glauber's salt and 3 kg. of the sulfonic acid compound product obtained by the oxidation with sodium peroxide of the resinous condensation product of phenol and sulfur chloride. As a result of the latter treatment the cotton fibers of the union fabric are selectively dyed, the wool fibers being reserved by the action of the sulfonic acid compound.

The said sulfonic acid compounds act also as resists on the silk fibers of union fabrics of slik and cotton, so that if the "half-silk" material (i. e., union fabric of silk and cotton) is dyed with direct dyestuffs, the silk fiber thereof remains considerably purer than if no resist is used. For union fabrics of silk and cotton, the dyeing process may be carried out as follows:

(3.) 1 kg. of a union fabric of silk and cotton is treated in an acid bath with 20 g. of ponceau G, the cotton-fiber thereof is then dyed in a fresh bath, at 50–60° C., with 20 g. of dianil green GN to which are added 200 g. of Glauber's salt and 30 g. of the sodium salt of the acid product resulting from the condensation of the resin obtained from phenol and acetic aldehyde with benzyl-chloride sulfonic acid. Said acid product has, in the form of its free acid, most probably the formula:



For the purposes of our above described invention it is advantageous to convert the sulfonic acids to be used into a convenient form by transforming them into their sodium salts or ammonium salts, drying and, if required, pulverizing them. The action of such salts is the same as that of the free sulfonic acids, particularly as the latter are in any case neutralized by the alkali of the dye-bath.

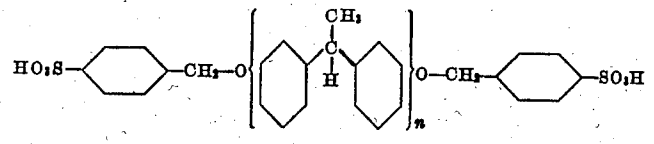
We claim:

1. Process for producing resists on animal fibers against dyestuffs, which consists in using for this purpose aromatic sulfonic acid compounds, the aromatic residues of which are connected with any residues by bridging atoms in the form of bivalent metalloids.

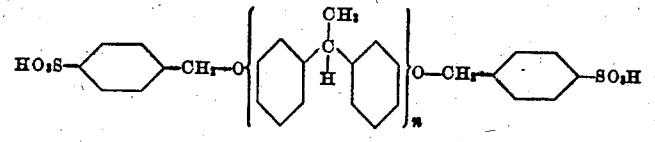
2. Process of obtaining two-colored effects on union fabric containing animal and vegetable fibers which comprises treating the union fabric in an acid dyebath containing a dyestuff adapted for dyeing animal fiber, rinsing the so-treated union fabric and treating the same in a non-acid dyebath containing a dyestuff adapted for dyeing vegetable fiber to which has been added an aromatic sulfonic acid compound the aromatic residue of which is connected with any residues by bridging atoms in the form of bivalent metalloids.

3. Union fabric the animal fiber of which has been resisted with an aromatic sulfonic acid compound the aromatic nucleus of which is connected with any residue by bridging atoms in the form of bivalent metalloids.

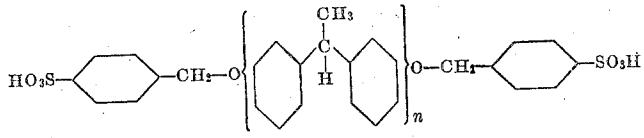
4. Process for producing resists on animal fibers against dyestuffs, which consists in treating the animal fibers with a solution of an aromatic sulfonic acid compound having most probably the formula:



5. Process of obtaining two-colored effects on union fabric containing animal and vegetable fibers which comprises treating the union fabric in an acid dyebath containing a dyestuff adapted for dyeing animal fiber, rinsing the so-treated union fabric and treating the same in a non-acid dyebath containing a dyestuff adapted for dyeing vegetable fiber to which has been added an aromatic sulfonic acid having most probably the formula:



6. Union fabric the animal fiber of which has been resisted with an aromatic sulfonic acid compound having most probably the formula:



In testimony whereof, we affix our signatures.

KARL DAIMLER.
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HUGO GÄRTNER.