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UNITED STATES PATENT OFFICE.

RONALD SMITH HORSFALL AND LESLIE GORDON LAWRIE, OF BLACKLEY, MANCHESTER, ENGLAND, ASSIGNORS TO BRITISH DYESTUFFS CORPORATION LIMITED, OF BLACKLEY, MANCHESTER, ENGLAND.

PROTECTION OF ANIMAL FIBERS AGAINST THE EFFECTS OF ALKALINE OR ACID MEDIUMS.

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It is well known that animal fibers, wool, silk, fur and the like, undergo deterioration when subjected to processes involving the use of alkaline liquors or even in some instances of acid liquors. Various substances have been proposed which are suitable to protect the material from this undesirable action of alkalies and acids. British Patent No. 188,632 claims the use of sulphite cellulose liquor and the condensation product of formaldehyde and naphthalene sulphonic acids have also been employed for this purpose.

We have now discovered that the soluble products prepared by condensing ureas with an aldehyde, particularly with formaldehyde, have an excellent protective action upon animal fibers, fur and the like, and either greatly diminish or wholly prevent their deterioration by alkaline or acid media. Condensation products of various ureas with formaldehyde, useful in the present invention, and their manufacture, are described in British Patents 151,016, 171,094 and 213,567. Our invention has a very wide application.

As examples of processes in which this undesirable action of alkalies ordinarily occurs and in which it may be wholly, or largely, prevented, we by the use of the present invention may mention wool scouring, the dyeing of wool with vat colours, the dyeing of wool with sulphur colours, degumming silk, the dyeing of silk with vat colours, the dyeing of silk with sulphur colours and killing and dyeing furs.

As examples of this protective action in the presence of acid liquors we may mention the following: the dyeing of wool with acid colours, especially fine worsted yarns which are liable to become felted on long-continued boiling in an acid dye bath, the mordanting of wool with chromic acid or chromium compounds, and the carbonizing of wool.

The most convenient method of applying our invention is to add one of the above-mentioned condensation products of urea and formaldehyde to the bath containing the material undergoing the alkaline or acid treatment. As examples of such substances, which we find exhibit a protective action, we may mention monomethyl urea, dimethylol urea, and the stage in the production of the insoluble resin described in British Letters Patent No. 213,567.

The following examples will serve to illustrate the manner in which this invention is applied, but the invention is not confined to these examples.

Example 1.—Scouring wool.

Unscoured wool is treated for ½ to ¾ hour at 45–50° C. in a bath containing 10 per cent of the weight of material of sodium carbonate and 5 per cent of the weight of material, of dimethylol urea; the wool is then thoroughly washed.

The wool is in this manner sufficiently scoured without having suffered damage, such as tendering or loss of elasticity, due to the injurious action of the alkali.

Example 2.—Dyeing silk with vat colours. (For 20 lbs. of silk yarn.)

To the dyebath containing about 50 gallons water are added 3 to 4 pounds caustic soda (76° Tw.), and the temperature is raised to 50° C. when 1 to 2 pounds sodium hydrosulphite powder are stirred in. The dyestuff (10–20 per cent paste) is made into a paste with hot water and added to the dye bath; the whole being stirred well until the colour is dissolved. Finally 1 to 2 pounds of dimethylol urea is added. The silk is entered and worked for ½ to ¾ hour, rinsed and allowed to oxidize.

Example 3.—Killing furs.

The furs are killed by brushing them with a solution containing 1–2 per cent of caustic soda to which has been added an amount of mono-methylol urea equal to one-fifth the weight of the caustic soda. The addition of dimethylol urea prevents the characteristic "burnt" or curled appearance which the action of strong caustic soda produces upon fur.

Example 4.—Dyeing worsted.

Worsted yarn is dyed for about 1 hour at the boil with 2 per cent of alizarine celestol B, together with 10 per cent of Glauber's salt, 2 per cent of sulphuric acid and 5–10

per cent of dimethylol urea, the percentages being calculated on the weight of the material.

Example 5.—Mordanting wool.

The mordanting bath is prepared with 3 per cent of potassium bichromate, 2.5 per cent of cream of tartar and 5 per cent of monomethylol urea. The material is entered, brought to the boil, and boiled for 1½ hours.

What we claim and desire to secure by Letters Patent is:—

1. The improvement in processes for the treatment of wool, silk, fur and other animal fibrous material in liquid media consisting in the addition to the said media of a soluble condensation product of an urea with formaldehyde.

2. The improvement in processes for the treatment of wool, silk, fur and other animal fibrous material in liquid alkaline media, consisting in the addition to the said media of a soluble condensation product of an urea with formaldehyde.

3. The improvement in processes for the treatment of wool, silk, fur and other animal fibrous material in liquid media consisting in the addition to the said media of a soluble condensation product of urea with a formaldehyde.

4. The improvement in processes for the treatment of wool, silk, fur and other animal fibrous material in liquid alkaline media, consisting in the addition to the said media of the soluble condensation product of urea with a formaldehyde.

5. The improvement in processes for the treatment of wool, silk, fur and other animal fibrous material in liquid media consisting in the addition to the said media of dimethylolurea.

6. The improvement in processes for the treatment of wool, silk, fur and other animal fibrous material in liquid alkaline media, consisting in the addition to the said media of dimethylolurea.

In testimony whereof we affix our signatures.

RONALD SMITH HORSFALL.
LESLIE GORDON LAWRIE.

DISCLAIMER

1,693,926.—*Ronald Smith Horsfall* and *Leslie Gordon Lawrie*, Blackley, Manchester, England. PROTECTION OF ANIMAL FIBERS AGAINST THE EFFECTS OF ALKALINE OR ACID MEDIUMS. Patent dated December 4, 1928. Disclaimer filed July 1, 1931, by the assignee, *British Dyestuffs Corporation Limited.*

Therefore disclaims from the scope and meaning of the claims of said Letters Patent No. 1,693,926, any interpretation of the liquid media therein referred to other than such liquid media which without addition of a soluble condensation product of an urea with formaldehyde or without the addition of dimethylolurea would be of such a character that they would in some degree or manner deleteriously affect the animal fibers treated.

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