

PATENT SPECIFICATION

(11) 1 222 423

NO DRAWINGS

- (21) Application No. 7955/68 (22) Filed 19 Feb. 1968
 (31) Convention Application No. 10320 (32) Filed 18 Feb. 1967 in
 (33) Japan (JA)
 (45) Complete Specification published 10 Feb. 1971
 (51) International Classification D 06 m 11/04 11/18
 (52) Index at acceptance

D1P A4 B4B B4D C1C C1H1B C1H1C C1H1X C1H2D
 C1H3A C1H3C C2A12A10 C2A2C C2A3 C2A8
 C2C10 C2C2 C2C3 C2C4 C2C5 C2C7 C2C9
 C3H 2
 C6 4



(54) TREATMENT OF KERATINOUS MATERIAL

(71) We, FUMIHIKO UMEZAWA AND HIDEFUMI UMEZAWA, subjects of Japan residing at No. 37, 3-chome, Sanno, Ohta-ku, Tokyo-to, Japan, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to the setting of keratinuous material such as animal hair, fur and woollen textiles.

It has previously been proposed to set keratinuous material such as animal hair and woollen textiles by the use of steam or hot water or by the chemical action of a thio-glycollic acid salt together with a bromide or persulphate. Such processes have generally been used to prevent the hair's tendency to crinkle, which is inherent in hair in the natural condition or may arise during the manufacture of the finished products from the raw materials. In another application, the setting process may be used to fix the shape of the material, for example into pleats. In the setting of furs, the steam hot water, or chemical treatments referred to above are hardly ever used. Instead, glycerin or a similar substance capable of retaining a large amount of moisture is used with due consideration given to possible disturbance of the nap, loss of hair, or deterioration of the fur. In this case the fur is coated with the substance by a brush, and pressed after the hair has been suitably arranged.

In the natural condition, fur hair, especially coarse hair, has a strong tendency to crinkle. Such a tendency is especially strong in the course of dyeing the fur. The hook-like shape that appears at the tip of hair, or the irregular waves that appear along the hair often considerably detract from the quality of the fur. Such a tendency is especially conspicuous in the case of fox fur.

As stated above, the setting of keratinous materials such as animal hair, fur and woollen

textiles can be effected by a relatively simple operation, but on the other hand disturbance of the nap is liable to result from the discoloration of hair itself (keratin protein), and the chemical treatment is likely to spoil woollen textiles often causing serious deterioration in the quality of the products. Also in the case of fur it is found that disturbance of the nap, loss of hair, and deterioration of the fur portion e.g. (a tendency to harden) are likely to result causing a conspicuous deterioration in the quality of the fur.

According to the invention there is provided a process for setting keratinous material which comprises treating the material, arranged in the desired configuration, in a first stage with a first solution containing one or more organic amine, ammonium or alkali metal ions, and an anionic or nonionic surface active agent and in a second stage with a second solution containing one or more alkaline earth metal or metal ions other than alkali metal ions, under alkaline or acid conditions; both operations being carried out in the absence of any reducing agent.

It is believed that this treatment leads to chelation of metal ions by the keratin proteins and thus sets the keratinous material.

By the process of the invention the hair fibres may be set straight or in a desired shape. The method of the invention for the setting of keratinous material such as animal hair, fur and woollen textiles is characterized in that, unlike the conventional methods, it not accompanied by deterioration in the quality of the products by, for example, disturbance of the nap, damage of fibres, loss of hair, a deterioration in the fur portion.

In other words, according to the invention, animal hair, fur and woollen textiles which are fixed in a certain shape may be set in this fixed shape by a chemical reaction such as metal chelating reaction in the keratin protein of the hair. In the first stage of the process, the treatment with the first solu-

[Price 5s. 0d. (25p)]

SPECIFICATION AMENDED - SEE ATTACHED SLIP

tion, suitably containing 0.1—5% by weight of the amine, ammonium or alkali metal ions leads to ions such as ammonium, sodium or potassium ions being taken into the keratin protein of the object treated by immersion.

5 Then in the second stage of the process, the treatment with the second solution, suitably containing 0.1—5% of alkaline earth metal ions or metal ions other than alkali
10 metal ions the amine, ammonium or alkali metal ions introduced into the keratin protein in the first stage are replaced by the other metal ions and in the keratin protein they give rise to a chemical reaction such as a metal
15 chelating reaction with a resultant retention of the fixed shape.

Instead of going through the two stages mentioned above, it is possible to operate in one single stage by mixing the solution for
20 the first stage with the solution for the second stage. That is to say, to the solution for the first stage is added the solution containing ions of alkaline earth metals or metals other than alkali metals. This solution may
25 also contain enzymes, proteins, peptides, or amino acids.

The treatment mentioned above is suitably carried out for 3 to 10 minutes, suitably at a temperature of from 30°C to 60°C, and the
30 solution ratio (i.e. the weight ratio of the material to be treated to the weight of the solution) is suitably 1:30—50.

After finishing the second stage treatment, the material being treated may be washed for
35 three to ten minutes in water as warm as or warmer than the solution for the second stage and is then dried. The dried material may then be washed at 30°C—50°C with a solution containing either marseilles soap, and/or 0.1—0.5% of an anionic or nonionic
40 surface active agent. The washing time is suitably three to ten minutes, while the solution ratio is suitably 1:30—50.

After washing, the material may be rinsed
45 with water at a temperature of 40°C—20°C, and then dried so that the fixed shape may be retained. The resultant material has a good set, its colour and touch being substantially the same as they were before treatment.

50 Keratinous materials such as animal hair, fur and woollen textiles treated according to the invention do not lose their set shape even if soaked in hot water at 95°C—100°C for more than ten minutes, whereas similar
55 materials which have been set by means of heat treatment with steam or hot water, lose all their set form is soaked in water at 50°C for only one minute and relapse into the pre-treated condition. If desired, the liquid
60 for each stage of treatment may be a little warmer than the liquid for the preceeding stage so that the liquid may be prevented from becoming dirty and the hair may be prevented from felting. It is also possible for
65 the liquid for each stage to be blended with

hair or skin tonic, or with a surface active agent.

Material that has been set according to the invention, can be restored to its original condition if such restoration is desired, by
70 treatment with a chelating agent such as a 0.1—2% by weight solution of sodium ethylene diamine tetra-acetate, 8 - hydroxy - quinone, and nitrilotriacetic acid, acids such as lactic acid, and halides such as bromides.
75 By this method the hair can be restored to the original condition by removing the chelate combination in the keratin protein of the hair. This restoration process requires three to twenty minutes and a temperature higher
80 than for the setting treatment.

If crinkled hair is to be straightened or hair is to be arranged in order by means of this invention, the treatment liquid may be
85 blended with a cream base or thickener such as carboxymethyl cellulose, polyoxyethylene-cetylalcohol ether, polyoxyethylene lauryl alcohol ether, or glyceryl monostearate, to provide a nemulsion or cream-like material.

Some of the metallic ions in the liquid, simultaneously with the setting, can also impart
90 colour to material which is originally white or light-coloured. Thus, using one or more kinds of metallic ions, if need be, one can obtain various colours at the same time as setting the material. These colours do not
95 change even if the material is soaked in water at 95°C to 100°C for more than ten minutes. If colouring and setting are to be effected simultaneously, treatment with a metal-containing dye can bring about the desired effect.
100

In order that the invention may be well understood the following examples are given by way of illustration only. In the examples all parts and percentages are by weight.
105

EXAMPLE 1

The following solutions were made up:—

Solution 1		
Sodium bicarbonate	0.8%	
Mono-ethanolamine	0.3%	110
N,N - di(2 - hydroxyethyl)- laurylamide	0.5%	
Water	add 100%	
Solution 2		
Ferrous chloride	1%	115
Polyoxyethylene alkyl ether	0.3%	
Water	add 100%	

Woollen yarn in the desired shape is soaked for five minutes in Solution 1 and 2 respectively. The yarn is then washed in warm water, then washed with soap solution and dried. The woollen yarn is then obtained set in the desired shape. The shape thus obtained does not change even if the yarn is soaked in warm water.
125

EXAMPLE 2

The following solution are made up:—

Solution 1

	Secondary sodium phosphate	1%
5	Sodium hydroxide	0.1%
	Lauryl alcohol sulphate ester	
	diethanolamine salt	0.3%
	Water	add 100%

Solution 2

10	Tin chloride	0.3%
	Polyoxyethylene alkyl ether	0.2%
	Water	add 100%

15 Woollen textile cloth is soaked in Solution 1 at about 40°C for three minutes. Then, kept in the desired shape, the cloth is soaked in Solution 2 at about 40°C for seven minutes, washed with soap solution and dried. The cloth is obtained set and fixed in the desired shape.

EXAMPLE 3

The following cream is made up:—

	Mono-ethanolamine	3%
	Potassium aluminium sulphate	0.5%
25	N,N - di(2 - hydroxyethyl)-	
	lauramide	0.2%
	Carboxymethylcellulose	6%
	Water	add 100%

30 In order to arrange the hair of a sheep skin in one direction or to straighten it by removing the crinkle, the skin is coated with the above-mentioned cream and, at a temperature of 40°C, the skin is stretched out in the desired direction or the hair brushed or combed in one direction. During this operation, the steam treatment may also be used, while fixing the object in the desired condition. After treatment the skin is soaped and

dried. Thus the desired arrangement of the hair direction and the removal of the crinkle thereof is obtained without damaging the sheepskin.

WHAT WE CLAIM IS:—

1. A method of setting keratinous material which comprises treating the material, arranged in the desired configuration, in a first stage with a first solution containing one or more organic amine, ammonium or alkali metal ions, and an anionic or nonionic surface active agent and in a second stage with a second solution containing one or more alkaline earth metal or metal ions other than alkali metal ions, under alkaline or acid conditions; both operations being carried out in the absence of any reducing agent.

2. A method as claimed in claim 1 in which said first solution contains from 0.1 to 5% by weight of the organic amine, ammonium or alkali metal ion.

3. A method as claimed in claim 1 or claim 2 in which said second solution contains from 0.1 to 5% by weight of said metal ions.

4. A modification of the method claimed in claim 1 in which the material is treated in a single stage with a solution containing the ingredients of said first solution and the ingredients of said second solution.

5. A method as claimed in claim 4 in which said solution also contains one or more of enzymes, proteins, peptides or amino acids.

6. A method as claimed in claim 1 substantially as hereinbefore described with reference to either Example 1 or 2.

7. A method as claimed in claim 4 substantially as hereinbefore described with reference to Example 3.

MARKS & CLERK,
Chartered Patent Agents,
Agents for the Applicant(s).

EXAMPLE 2

The following solution are made up:—

Solution 1	
Secondary sodium phosphate	1%
5 Sodium hydroxide	0.1%
Lauryl alcohol sulphate ester	
diethanolamine salt	0.3%
Water	add 100%
Solution 2	
10 Tin chloride	0.3%
Polyoxyethylene alkyl ether	0.2%
Water	add 100%

15 Woollen textile cloth is soaked in Solution 1 at about 40°C for three minutes. Then, kept in the desired shape, the cloth is soaked in Solution 2 at about 40°C for seven minutes, washed with soap solution and dried. The cloth is obtained set and fixed in the desired shape.

EXAMPLE 3

20 The following cream is made up:—

Mono-ethanolamine	
Potassium aluminium sulphate	3%
N,N - di(2 - hydroxyethyl)-	0.5%
25 lauramide	0.2%
Carboxymethylcellulose	6%
Water	add 100%

30 In order to arrange the hair of a sheep skin in one direction or to straighten it by removing the crinkle, the skin is coated with the above-mentioned cream and, at a temperature of 40°C, the skin is stretched out in the desired direction or the hair brushed or combed in one direction. During this operation, the steam treatment may also be used, while fixing the object in the desired condition. After treatment the skin is soaped and

dried. Thus the desired arrangement of the hair direction and the removal of the crinkle thereof is obtained without damaging the sheepskin. 40

WHAT WE CLAIM IS:—

1. A method of setting keratinous material which comprises treating the material, arranged in the desired configuration, in a first stage with a first solution containing one or more organic amine, ammonium or alkali metal ions, and an anionic or nonionic surface active agent and in a second stage with a second solution containing one or more alkaline earth metal or metal ions other than alkali metal ions, under alkaline or acid conditions; both operations being carried out in the absence of any reducing agent. 45

2. A method as claimed in claim 1 in which said first solution contains from 0.1 to 5% by weight of the organic amine, ammonium or alkali metal ion. 50

3. A method as claimed in claim 1 or claim 2 in which said second solution contains from 0.1 to 5% by weight of said metal ions. 55

4. A modification of the method claimed in claim 1 in which the material is treated in a single stage with a solution containing the ingredients of said first solution and the ingredients of said second solution. 60

5. A method as claimed in claim 4 in which said solution also contains one or more of enzymes, proteins, peptides or amino acids. 65

6. A method as claimed in claim 1 substantially as hereinbefore described with reference to either Example 1 or 2. 70

7. A method as claimed in claim 4 substantially as hereinbefore described with reference to Example 3. 75

MARKS & CLERK,
Chartered Patent Agents,
Agents for the Applicant(s).

Printed for Her Majesty's Stationery Office, by the Courier Press, Leamington Spa, 1971.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.



* C L M S *