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TREATED FUR FIBERS

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The present invention relates to the treatment of fur fibers to improve the felting quality and the color acceptance thereof and the use of said fur fibers.

In order to secure high grade fur felt it is necessary that the fur fibers have uniform dye acceptance of acid dyestuff so as to avoid a mottled appearance in the dyed product and be readily feltable into a tight felt having required standard characteristics of feel and texture and which can be shaped into the desired shapes.

Three of the sources of fur used in fur felt are cut fur, sulphuric acid boiled fur, and chopped fur. Cut fur is fur cut from carroted hides and ready for felting. It has been discovered, however, that some of this fur may not felt well and may not have uniform dye acceptance. It is believed that this is caused by the physical condition of the animals from which the pelts are taken which alters the character of the fur and its reaction to the carroting solution. When quantities of cut fur are received, test samples are taken and these show up in many instances the poor felting quality which produces a loose soft felt and poor dye acceptance of the fur producing a mottled appearance. This fur would normally be rejected and discarded.

Chopped fur is produced from small pieces of fur, such as muskrat, beaver, hare, coney and mink which result from the cutting of pelts in coat making or other similar manufacture. These small pieces may be glued to a paper and carroted or may be left uncarroted. The pieces are then chopped to mechanically disintegrate the hide and the fur separated therefrom. Such fur as is produced by these methods has relatively poor felting properties and in some instances the dye acceptance is very low.

Sulphuric acid boiled fur is an important by-product of the fur industry. This is a short stock fur fiber which is obtained from pieces, such as scrap fur from trimmings, and the ears, paws, tails, etc. of rabbits. The fur is obtained by boiling these pieces in sulphuric acid usually about 10% aqueous solution for about one-half hour to dissolve their hide. The fur which remains is then washed in cold water to remove the excess sulphuric acid, hydroextracted and dried. Such fur shall be referred to herein as boiled fur.

Difficulty has been encountered in employing boiled fur as short stock in fur felt, and particularly fur felt hats, because of its poor dye acceptance and because of an impairment in its felting property. It was believed that these

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deficiencies in boiled fur were due to the fact that in the freeing of the fur from the pelt there was a formation on the fur of insoluble metallic salts caused by hard water or that there was a formation on the fur of insoluble glutinous tissues, which formations would prevent penetration of the dye and which would retard its felting action.

We have discovered, however, that to the contrary, boiled fur is cleaner than unboiled fur. We have discovered that the cause of the poor dye acceptance and poor felting is brought about because of a change in the chemical structure of the fiber due to the action of sulphuric acid thereon which reduces the amino nitrogen content in the protein fiber.

The present invention overcomes the difficulties encountered in furs such as noted above by providing a chemical treatment for said furs which causes the fur to have improved felting properties and also improved dye acceptance.

This is accomplished by applying to the fur fibers a resinous surface or surface layer of a water insoluble reactive nitrogen base formaldehyde polymer. The resin may be applied in several ways, for example, as a solution to loose fur fibers and then dried thereon and the fur blown and separated. In another example, the solution may be incorporated in the carroting solution and applied to the fur by brushing during the carroting operation or it may be brushed on prior to or immediately after carroting as a separate solution. As a still further example, the solution may be applied to a partially felted piece prior to the dyeing and completing the felting thereof.

We have found that higher quantities of inferior fur, treated in accordance with the present invention, may be used than heretofore and still produce a felt which is tight, has the characteristics of feel, texture and appearance, and wearing qualities meeting the standards of a high grade fur felt fabric, and that the fabric was substantially free of any mottled appearance due to poor dye acceptance of some of the fur fibers therein.

While the invention is described as applied to the manufacture of fur felt hats, it is to be understood, however, that this is by way of example only and that other applications of the treated fur fibers can be made as required.

In the manufacture of fur felt hats the fur is carroted on the pelts and is cut. These fibers are classified with the best fibers known as entire or long stock fibers and a felting or inferior

fiber known as short stock fibers. A mixture of these fibers, as determined by the quality of the hat to be produced, is deposited on a cone to form a bat. The bat is hardened and removed from the cone and subjected to hot water, pressure and motion, the temperature of the water usually being 140°–180° F. to cause the fibers in the bat produced on the cone to felt and shrink, in acceptable shrinking time, into a hat body. Before the hat body is finished it is boiled in an acid dye suitable for dyeing fur for a period of one-half hour to 2 hours.

In preparing the short stock fibers to be used with the entire in the blend, according to the present invention, we first prepare a solution or composition having an amino nitrogen group therein, which solution has a property of being rendered water insoluble directly after being dried on the fur.

Example I

One such solution can comprise of from 2 to 10 parts by weight of melamine, 2.5 to 14 parts by weight of hydrochloric acid (37%) and 3.5 to 16 parts by weight of formaldehyde (35–40%) and water 92 to 60 parts by weight, with the preferred solution within these limits comprising 10 parts by weight of melamine, 14 parts by weight of hydrochloric acid (37%), 16 parts of formaldehyde (35–40%) and 60 parts of water. This solution is reduced in an equal proportion of 20% aqueous isopropanol solvent. This reduced solution is applied to the fur to be treated, for example, boiled fur, by immersing the loose fibers and impregnating them so that they have a coating or surface layer thereon derived from the impregnating solution. They are dried and the coating cured at high temperatures of up to 350° F. or by aging for suitable periods of time to render the resin insoluble in water, particularly at temperatures up around 212° F. They are then blown to separate the fibers.

While heretofore hats having as little as 5% of untreated boiled fur blended with unboiled fur, such as entire, produced an inferior article because of its poor dye acceptance and poor felting qualities, we have found that with the treated boiled fur as short stock we may use up to 50% of the boiled fur and produce a highly satisfactory and acceptable hat, both as to feel and texture. We have also found that inferior cut fur and chopped fur when similarly treated can be used in greater percentages in the mix and still produce a better hat as to tightness of felt and uniformity of color than heretofore obtained with but small quantities of said inferior fur.

Other examples of fur treating compositions which we have tried and found to be satisfactory for the purpose of improving the felting properties and dye acceptance of inferior furs are set out below. The parts referred to throughout the specification and claims and in the examples are by weight.

Example II

A reaction mixture of 100 parts methylol melamine-formaldehyde polymer, 50 parts glacial acetic acid and 450 parts isopropanol.

Example III

A reaction mixture of 100 parts methylol melamine-formaldehyde polymer, 70 parts diethylamine, 45 parts hydrochloric acid (37%) and 1075 parts isopropanol.

Example IV

A reaction mixture of 100 parts methylol melamine-formaldehyde polymer, and 60 parts aqueous monoethylamine (70%). This mixture is acidified with glacial acetic acid and then reduced to the required strength with isopropanol.

Example V

A reaction mixture of 20 parts melamine hydrochloride, 20 parts stearylamine acetate, and 200 parts water. 1 to 20% of this mixture is dissolved in water or organic solvent.

Example VI

A reaction mixture of 105 parts distearylammeline, 13.5 parts para formaldehyde, 46 parts tetramethylmethylene diamine and 200 parts petroleum ether. This solution is boiled for 2 hours and then dried. 1 to 20% of this dried mixture is dissolved in water or organic solvent.

Example VII

A reaction mixture of 40 parts melamine, 40 parts urea, 225 parts formaldehyde (35–40%) and 1400 parts water.

Example VIII

A reaction mixture of 70 parts urea-melamine-formaldehyde polymer, 60 parts hydrochloric acid (37%) and 800 parts water.

Example IX

A urea-melamine-formaldehyde polymer dissolved in isopropanol.

Example X

A urea-formaldehyde polymer dissolved in water or suitable organic solvent.

It will be noted that all of the treating compositions set out above have in common the inclusion of an amino nitrogen group and all will provide a resinous coating or surface having the characteristic of becoming water insoluble directly after they are dried on the fur.

While in the above example the loose fibers of short stock were impregnated with the treating composition, we have found that the advantageous results of the invention can be obtained by mixing the treating solution with the carroting solution so that it can be simultaneously brushed onto the fibers during the carroting operation or it can be brushed on the fibers before or after the carroting operation. Also, it may be applied on hardened hat bodies before they are finished and dyed with the same results.

Further tests have shown us that high grade fur, such as entire, which has been carroted to render it feltable, has been improved, though to a lesser degree, in its felting and color acceptance properties by the application of the treating solution thereto.

In its broader aspects, we are, so far as we know, the first to apply a water insoluble resinous coating on the fur fibers which improves the felting properties of the fibers to produce a tight felt in the accepted shrinking time, which felt has the required surface and feel and is readily dyed by acid dyes without a mottled appearance.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

We claim:

1. In the method of making a uniformly dyed fur felt fabric having entire and inferior fur fibers dispersed throughout the fabric, the steps

of treating inferior fur fibers with a reaction mixture including melamine and a reactant of the group consisting of formaldehyde, monoethylamine, diethylamine, stearylamine and tetramethylmethylene diamine and drying said fibers to form a surface of water insoluble reaction product thereon to improve both the dyeing and felting properties thereof; mixing said treated fibers with entire; felting the fur mixture with hot water, pressure and motion and causing the treated fibers to be dispersed throughout the felt fabric; and dyeing the felted fabric with an acid dye.

2. In the method of making a uniformly dyed fur felt fabric having entire and inferior fur fibers dispersed throughout the fabric, the steps of improving the dispersability and felting and the dyeing properties of fur fibers having inferior felting and dye acceptance properties by forming on said inferior fur fibers a surface of a water insoluble resin which is a reaction product of formaldehyde and a reactant having an amino nitrogen group therein; mixing said surfaced fibers with entire; felting the fur mixture under the action of boiling water and pressure and causing the treated fibers to be dispersed throughout the felt; and dyeing the felted fabric with an acid dye.

3. In the method of making a dyed fur felt fabric, the steps of mixing inferior fur and entire; forming and hardening a bat of the mixed fibers; applying a reaction mixture including melamine and formaldehyde and drying said fibers to form a surface of water insoluble melamine-formaldehyde reaction product on the fibers in the bat to improve both the dyeing and felting properties thereof; completing the felting of the bat; and dyeing the felted fabric with an acid dye.

4. In the method of making a dyed fur felt hat body, the steps of mixing inferior fur and entire; depositing the mixture on a cone to form a bat; hardening the bat of the mixed fibers; applying to the bat after hardening and before completing the felting of the fibers a reaction mixture including melamine and formaldehyde and drying said fibers to form a surface of water insoluble melamine-formaldehyde reaction product on the fibers in the bat to improve both the dyeing and felting properties thereof; completing the felting of the fibers and shrinking of the bat into a hat body; and dyeing the felted fabric with an acid dye.

5. In the method of making a uniformly dyed fur felt hat body having entire and inferior fur fibers dispersed throughout the body, the steps of improving the dispersability and felting and the dyeing properties of fur fibers having inferior felting and dye acceptance properties by forming on said inferior fur fibers a water insoluble surface of a melamine-formaldehyde reaction product; mixing said surfaced fibers with carroted entire; forming said mixed fibers into a conical bat; felting and shrinking the conical bat with hot water, pressure and motion into a hat body and causing the treated fibers to be dispersed throughout the hat body; and dyeing the felted hat body with an acid dye.

6. In the method of making a dyed fur felt hat body, the steps of applying a carroting solution and a reaction mixture including melamine and formaldehyde to inferior fur fibers and drying said fibers to form a surface of water insoluble melamine-formaldehyde reaction product on the fibers to improve both the dyeing and felting properties thereof; mixing said treated inferior fur with carroted entire; forming and hardening a bat of the mixed fibers; felting and shrinking the bat to form a hat body; and dyeing the hat body with an acid dye.

7. A cut feltable fur fiber for use with entire in dyed fur felt comprising an inferior fur fiber having a surface layer thereon of a resinous reaction product of formaldehyde and a reactant having an amino nitrogen group therein, said surface layer being water insoluble when dried and improving the felting and dyeing properties of the fiber.

8. A cut feltable fur fiber for use with entire in dyed fur felt comprising an inferior fur fiber having a surface layer thereon of a reaction product of formaldehyde and a reactant of a group consisting of melamine, methylol melamine, monoethylamine, diethylamine, distearylammeline and tetramethylmethylene diamine and mixtures thereof, said surface layer being water insoluble and improving the felting and dyeing properties of the fur.

9. A dyed fur felt fabric comprising entire and an inferior fur fiber dispersed therewith and having a surface layer thereon of a resinous reaction product of formaldehyde and a reactant having an amino nitrogen group therein, said surface layer being water insoluble and improving the dispersability and felting properties and the dyeing properties of the fiber.

10. A felt hat body comprising entire and inferior fur fibers dispersed therewith, at least the inferior fur fibers having a surface layer thereon of a reaction product of an aldehyde and a reactant of a group consisting of melamine, methylol melamine, monoethylamine, diethylamine, distearylammeline and tetramethylmethylene diamine and mixtures thereof, said surface layer being water insoluble and improving the felting and dyeing properties of the fur.

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