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HAT AND METHOD OF MAKING THE SAME

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17 Claims. (Cl. 28—5)

This invention relates to improvements in fur-felt type hats and to improved methods of making the same.

Coney, rabbit, hare, muskrat and other fur which is satisfactory for the making of fur-felt hats is quite expensive, ranging in cost from $1.00 to $6.00 per pound, with beaver fur which is used in the very finest hats ranging up to $15.00 per per pound. Consequently material cost alone in hats manufactured from such materials is considerable. Also, since much of it is imported from far distant places with irregular transportation certain types thereof are sometimes not available when needed.

One of the main objects of the present invention is the production of fine quality hats from more readily available and less expensive materials.

A complemental object is to manufacture hats from inexpensive materials which look and feel like 100% fur-felt hats.

Heretofore there have been many efforts to make hats which would have the feel, color and appearance of regular and fine fur-felt hats even though other fibers much less expensive than fur were included in the body thereof. Although many efforts have been made, for fifty years or more, no really practical solution has been proposed before the present invention.

A feature resulting from the attainment of this object is the making of hat bodies including a mixture of from 25 to 95% of regular fur, normally used in making fur-felt hats, and 5 to 75% of specially selected and worked inexpensive casein fibers to complete the body, said fur and casein fibers being thoroughly intermingled and felted together. The latter is now preferably accomplished with water and/or steam and pressure. This feature results in much less expensive hat bodies having the feel, color and appearance of 100% fur-felt hats.

Heretofore efforts to provide hat bodies with nonfur fibers have often resulted in failure because the fibers did not react to the dyeing in the same manner as the fur.

It is therefore an object of the present invention to devise and mix relatively inexpensive (nonfur) fibers with fur fibers which will have the characteristic of absorbing and reacting to the acid dyes normally used for fur dyeing in the same manner as fur.

A feature resulting from the attainment of this object is the thermalizing of the nonfur fibers, as pointed out in detail hereinafter, whereby the affinity of such fibers for dyestuffs may be controlled.

Further features resulting from the present invention are: a faster shrinking of the hat bodies than when the same are made entirely of fur felt (which it now appears will result in increased output and reduced labor cost); a perfect or even coloring of the fur and nonfur (casein fibers); less chance of straining or breaking hat bodies in the green or early forming and starting stages of manufacture; large proportion of nonfur fibers may be used; easier and less expensive manufacture of white or light pastel colored hats; elimination of hard shrinking; elimination of the scalding or retightening usually required upon hat bodies which are recolored or redyed for any reason; and, the production of part-fur hats with rough or scratch type finishes (such as silks, velours, or suedes), which have the appearance of all-fur felt hats of those types.

Other objects, features and advantages will appear hereinafter.

The present invention is the result of very extensive research and many experiments over a considerable period of time. This work has resulted in an improved process of making hats, and new and useful hat bodies.

Broadly, the present preferred process of the present invention includes the steps of: (1) preparing fur in the usual manner for making fur-felt hats; (2) forming casein fibers, preferably between 10 to 30 microns in diameter, and on the acid side between 2 and 5 pH; (2*a*) optional—thermalizing the fibers; (3) optional—removing snubs and noils, and separating fibers—as by dry carding and French combing the long casein fibers which are preferably between 10 to 30 microns in size, to remove the snubs and noils, and to separate the fibers; (4) cutting said long casein fibers into staples of preferably approximately ¼ to 1 inch length; (4*a*) optional—blowing or otherwise working the cut casein fiber staples to further separate the same; (5) blending said fur and casein fibers (the casein fibers may be further separated during this blending step, but are preferably separated as at 4*a*); (6) forming a cone of said mixed fur and casein fibers; (7) felting the fur and casein fibers—as by working said cone with water (or steam) and pressure to shrink the same very substantially; (8) optional—dyeing. This process will now be described in detail.

Fur

A suitable quantity of felting fur is prepared, in the well-known manner of preparing fur for hats (viz., Coney, rabbit, hare, beaver or other fur is cleaned, carroted, clipped from the hides or skins and dehaired).

There are many reasons why it is desirable to substitute fur fibers with nonfur fibers when making hats. For example: fur is expensive, at present ranging from $1.00 to $15.00 per pound; fur may be charged with mercury during the usual carroting thereof, which can be harmfully transmitted to workers; fur is not always readily available, because much of it comes from far distant places; and, fur is notable for its lack of uniformity, as the physical characteristics thereof are greatly affected by the age of the animal from which the fur is taken, age of the skin after it is taken from the animal, slight variables in the carroting process, vagaries of diet of the animal and weather in the particular country in which it grows, time of the year in which the animal is killed, humidity and temperature at the time and place hats are made from the fur, and by many other factors.

The present invention does not provide a very satisfactory inexpensive substitute for expensive fur which may displace from 5 to 75% of the usual fur-felt mixture in hats, largely eliminates the hazard of mercury-carroted fur, is readily available, is uniform in its physical characteristics, and has other advantages.

Casein fiber

After very extensive research, many experiments and after overcoming many special problems, a fiber, satisfactory as a substitute for fur, and a method for using the same, have been evolved. This substitute is a casein fiber which is preferably between 10 to 30 microns in size. Such fibers 18 microns in size have so far proved best. Further, these casein fibers are preferably made on the acid side preferably between 2 and 5 pH. Although casein fibers of larger than 30-microns size may be used the same results in a rather coarse, stiff and/or "boardy" type of hat.

In developing a fiber, to substitute for fur, certain important problems had to be met and solved. In this connection it was necessary to have a fiber which would: hold up well against hot water and steam; be kept free of oil and softening agents; have a soft rather than a stiff, harsh "hand"; have a uniform hardness; and have controllable dye-absorption characteristics.

To this end the casein fibers are very carefully made—as by: selecting the acid-coagulable protein of the milk; preparing and processing the casein so that its ash content is low, so that it is free from bacterial composition products, and free from peptonized decomposition products. Next the so-prepared casein is dispersed by a suitable alkali, such as caustic soda or ammonia, preferably in minimum quantities, to avoid hydrolytic cleavage products (viz., breakdown of the proteins). The solution is then carefully filtered (pigments may be added), and brought to suitable viscosity for spinning or extruding through spinnerettes. Filaments from the spinnerettes are extruded into a coagulating bath of alum or other known casein-coagulating mediums of such a character and at a rate to yield a fiber of the desired strength and elasticity. The fiber is then hardened and finished by subjecting the same to hardening agents such as formaldehyde (some of the latter preferably under pressure), and baths to wash out the salts, to unsolubilize and to block and inactivate any of the reaction bonds which might otherwise allow excess hydration or dye absorption when subjected to the hat-making operations.

The operation on the fiber subsequent to the initial coagulating bath is herein referred to as "thermalizing" and further reference thereto is made hereinafter. Preferably, and especially for rough or scratch finish hats (e. g., silks, velours and suedes), the casein fibers are thermalized.

The thermalizing operations also considerably improve the wet strength of the fibers so that it can withstand the considerable working in the wet (e. g., shrinking, described hereinafter) and at the same time causes the fiber to retain the thermoplastic properties (viz., become somewhat but not too plastic) whereby it conforms to the desired orientation and configuration in tying or hooking with the fur and yet set up and retain its hook and oriented shape as the hat body is dried.

The making of these casein fibers is more fully described and claimed in several pending U. S. patent applications, and is not claimed herein.

In some instances it may be desirable to form hats from casein fibers, without removing the snubs and noils, and without carefully separating the fibers. This may be desirable to get a nonuniform, or a novelty effect in the hat body.

Preferably, or more often, however, the snubs and noils are removed and the fibers separated in order to get a smooth uniform finish. This may be done in many different ways. The present preferred manner will now be described.

Carding and combing

In order to insure a smooth and even mixture or blend of casein fibers with the fur the long casein fibers are preferably worked to remove the snubs and noils and to separate the fibers. This working may be done in various ways. The present preferred way includes the steps of carding and of French combing with usual carding and combing equipment. These casein fibers are now about 3 inches long during the carding and combing operation. Normally carding is done with a certain amount of oil. Carding of these casein fibers may be done in the usual manner with oil. However, such oil carding may adversely affect the fibers so that a nonuniform dyeing results. Preferably, the long casein fibers are subjected to a dry carding operation on usual carding machinery and then to French combing on usual machinery, in order to remove the snubs and noils, and to separate the fibers.

Cutting

After the snubs and noils of the casein fibers are removed and the fibers separated, as by carding and French combing operation just described, the long casein fibers are cut into staples. Preferably these staples are between ¼ to 1 inch length. Staples of ¾ inch length have proved particularly satisfactory.

Blending

After fur has been properly prepared for felting and the casein fibers have been prepared, as described hereinbefore, the fur and casein fibers are mixed or blended together. Any of the usual apparatus for blending fur may be used for this purpose. One form of such apparatus in-

cludes a large casing with eight high-speed picker rolls which pick the fur and casein fibers from slow moving feed rolls and swirl them about until they are thoroughly blended. This step also serves to separate the casein fibers which may happen to stick together after the cutting operation. Preferably, though, the casein-fiber staples are first blown or otherwise separated with usual apparatus before being blended with fur.

In some instances it is desirable to include certain other fibers, for example for ornamental effects. Thus, staples of "Ducea," which is a viscose rayon, may be added. Jute, ramie and other fibers may also be used. Since such fibers will not dye like the fur, or like the casein fiber, a novel color effect is achieved. Preferably, more fur is used when such a nonfelting fiber is added to the mixture. For example, 10% by weight of such viscose rayon fibers may be very satisfactorily used with 75% fur and 15% casein fibers. A greater or less amount of such viscose rayon or other fiber may be used with the fur, dependent upon the final effect desired. Since many different types of fiber and sometimes even short lengths of fine wire are used for novelty effects, and because the present invention is primarily related to the use of casein fibers, the fur and other fibers, such as those used for novelty effects, will be herein referred to as the fur-mix. It is possible to use from 25 to 95% by weight fur-mix and from 5 to 75% of casein fibers.

Coning

After the fur and casein fibers are thoroughly intermingled or blended they are formed into a hat cone in the usual manner and with the usual apparatus. One such method and apparatus includes depositing the blended fur and casein fibers upon a perforated cone within an enclosed chamber, the fur and casein fibers being blown about within the chamber and being uniformly sucked or drawn upon the perforated cone. The thin film of fur and casein fibers is then wetted down upon the cone to form a "green" hat body which is normally approximately 20 to 32 or more inches long, and 22 to 34 or more inches across the flattened lower part of the cone.

Shrinking

Subsequently the green hat body of fur and casein fibers is subjected to shrinking operations. The present preferred shrinking is to subject this fur and casein fiber blend to a series of wet shrinking operations, and on apparatus similar to those used in regular fur-felt hat making. These shrinking operations consist in subjecting the green hat body to a wet working with pressure. The wet working is effected with steam and hot water, at temperatures ranging anywhere from 100° to 212° F. This wet and pressure working of the green hat body effects a shrinking thereof, normally from the aforementioned cone sizes to cones as small as approximately 9 inches long, and 14 inches wide across the flattened lower edge. A series of Homer A. Genest (and Lorenz) United States patents show a method and apparatus now used extensively for shrinking fur-felt hats which may be used for shrinking products of the present invention.

It is important, however, to note that applicants are able to effect a full and usual shrinking of the hat of the present invention which has a very substantial percentage of casein fibers therein in the same manner that the fur-felt hats are shrunk, and to shrink the same in a shorter time than is required in shrinking 100% fur-felt hats. Heretofore substitute fibers proposed to replace fur proved "dead"; viz., failed to felt or hook together with the fur and/or failed to shrink with the fur. Hat bodies or bats in the early or "green" stage when made with casein fibers therein have much less tendency or straining or breaking when handled during the forming or starting, or early shrinking steps.

Thermalizing

The term thermalizing and the process has been described in some detail hereinbefore. Additionally it may be pointed out that as used herein it means, for example, subjecting the casein fiber to add treatment in a formaldehyde bath or baths. For example, casein fibers are extruded in the normal manner for forming filaments and are passed into a coagulating bath in order to set the same. However, such fibers are somewhat soft and porous. By thermalizing the casein fibers, viz., subjecting the same to a second, third or fourth bath in formaldehyde preferably under pressure, it is possible to make the same less receptive to the dye so that it will normally absorb the dye substantially the same extent as the fur and thereby result in a uniform color of hat body.

This thermalizing treatment has the further and important advantage of making the casein fibers more resistant to the pouncing and other cutting operations so that they will "hold up" like fur when making scratch or rough finish hats. For example, during the finishing operations on hats it is customary to cut down or work the outer surface thereof with sandpaper, wire brush or wheels, shark skin, glass paper or the like to make scratch or rough finish hats (e. g., silks, velours, suedes, etc.). Ordinary casein fibers are softer than fur so that they would normally cut down more quickly than the fur and so that flats and the like might be created on the surface thereof if there happens to be an excess rather than a balanced arrangement of casein fibers in certain isolated spots. By thermalizing the fibers the same may be made to be resistant to the cutting action in substantially the same degree as the fur fibers whereby a uniform surface effect of the desired type is produced during the pouncing, cutting-down or finishing operations. For smooth hats the thermalizing may be omitted. Preferably the thermalizing is done prior to the carding and combing step.

Also, it is important to note that the casein fibers are particularly resistant to the acids normally prevalent during the shrinking operations so that the casein fiber is not dissolved or otherwise radically and adversely changed. Certain fibers heretofore proposed as substitutes for fur had the disadvantage of dissolving or otherwise spoiling when subjected to the usual shrinking operations.

After the hat body or bat, of the present invention, is shrunk the desired extent and to the desired size, it may be subjected to all the usual "front shop" operations in the hat factory (viz., blocked, ironed and finished to the desired shape and trimmed to the desired style).

It has been found that hats made with casein fibers when subjected to ironing and other usual finishing operations have a very fine feel.

Dyeing

After the hat is properly shrunk (and sometimes during the shrinking operations) the hat

body is dyed to the desired color. Heretofore certain fibers proposed as substitutes for fur in fur-felt hats did not "take" the dyes at all or did not "take" the dyes properly. In this connection, even the casein fibers presented special problems which, however, were finally solved. Casein fibers which, according to the present invention, are used with fur in making hats are preferably made on the acid side from 2 to 5 pH so that they have affinity for the acid dyes normally used in dyeing fur-felt hats which is a real advantage. By thermalizing the casein fibers it is possible to further control the extent to which the casein fibers absorb the dyestuff.

The term per cent (and symbol %) as used herein refers to the percentage of weight of the hat body (e. g., 75% fur and 25% casein fiber would mean 75 lbs. of fur and 25 lbs. of casein fiber).

Ordinary fur felt as used in hats will carry a certain small amount of "dead" or nonfelting fibers, for example, long coarse hairs, certain coarse vegetable fibers, etc. However, the fur felt will carry only a comparatively small amount of such material, and it is quickly weakened thereby. It is not yet fully understood whether the casein fibers actually felt with the fur in some manner or whether they deform, twist or hook about the fur during the wet and pressure working. The term "felting" or "felting together" is used herein to means either an actual felting together of the fur and casein fiber in the manner of 100% fur or any entangling, hooking together or other action and result whereby the casein fibers are held by the fur or the fur held by the casein fibers.

It is appreciated that wide limits are set forth in the amount of casein fiber used, or conversely in the amount of fur or fur-mix used. However, it is one of the very important advantages of the present invention that hats of the cheaper grades may be made with up to 75% by weight of the body made from casein fibers, whereby very considerable savings in material costs are effected.

Excellent hats have been made with 10 to 15% of casein fiber and 85 to 90% of fur or fur-mix. Good hats have been made with a 50–50% such mixture; and hats of the cheaper grade have been made with a 75% casein fiber and 25% fur or fur-mix blend.

Normally casein fibers have a decided yellow cast or color. However, the casein fibers may be pigmented. For example, approximately ½ to 1% or more white pigment may be added to the casein solution prior to its extrusion into filaments to make practically pure white casein fibers. These are especially advantageous for use with white fur, to make pure white hat bodies or to provide very light colored bodies which may be used advantageously when making pastel colored hats.

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

Having thus described the invention what is claimed as new is:

1. A method of making hat bodies which comprises dry carding and combing long casein fibers; preparing fur for felting; cutting said long casein fibers into staples; blending said fur and said staples of casein fibers; forming the blended fur and casein fiber staples into a cone; and wet shrinking said cone.

2. A method of making hat bodies which comprises the steps of preparing fur for felting; preparing long casein fibers; thermalizing said casein fibers; removing the snubs and noils, and separating the fibers; cutting said casein fibers into staples; blending the fur and the casein fiber staples; forming the blended fur and casein fiber staples into a cone; and wet shrinking said cone.

3. A hat body including fur; and casein fibers between 10 and 30 microns in diameter, and between ¼ and 1 inch in length, thoroughly intermingled and felted together.

4. Hat bodies including 25% to 95% by weight of fur; and 5% to 75% by weight of casein fiber staples, 10 to 30 microns in diameter, ¼ to 1 inch long, on the acid side between 2 to 5pH, all thoroughly blended and felted together.

5. A hat body including 25% to 95% by weight of a fur-mix, characterized by an admixture of from 5% to 75% by weight of thermalized casein fibers, thoroughly intermingled and felted together.

6. A hat body including fur; and casein fiber staples, between 10 and 30 microns in diameter, thoroughly intermingled and felted together.

7. A hat body including fur; and up to 75% by weight of pigmented casein fiber staples, thoroughly intermingled and felted together.

8. A method of making a fur hat body which comprises the steps of preparing fur fibers for felting; preparing casein fibers of from 10 to 30 microns diameter including substantial amounts of ¼ to 1 inch staples; blending said fur fibers and casein fiber staples; forming said blend of fur and casein fiber staples into a cone; and wet shrinking the cone into a hat body ready for final blocking and finishing.

9. A method of making hat bodies which comprises preparing a fur-mix ready for felting; preparing long casein fibers; thermalizing said casein fibers; cutting said casein fibers into staples; blending said fur-mix and casein fiber staples; forming said blended fur-mix and casein fiber staples into a cone; and shrinking said cone, to form a hat body ready for final blocking and finishing.

10. A method of making fur-type hat bodies which comprises the steps of preparing fur for felting; preparing nonfur fibers fur-mix and novelty effect purposes; preparing casein fiber staples; blending said fur, nonfur fiber staples and casein fiber staples; forming said blend into a cone; and shrinking said cone to form a hat body ready for final blocking and finishing.

11. A method of making a hat body which comprises the steps of preparing fur fibers for felting; preparing long casein fibers; subjecting said casein fibers to a plurality of thermalizing treatments; removing the snubs and noils from the casein fibers, and separating the fibers; cutting said casein fibers into staples; blending the fur fibers and the casein fiber staples; forming the blended fur fibers and casein fiber staples into a cone; and wet shrinking said cone.

12. A method of making hat bodies which comprises the steps of preparing fur fibers for felting; preparing long casein fibers; subjecting said casein fibers to a plurality of thermalizing treatments; removing the snubs and noils from the casein fibers, and separating the fibers; cutting said casein fibers into staples; preparing nonfur fibers for a fur-mix; blending the fur fibers, nonfur fibers and casein fiber staples; forming the blended fur fibers, nonfur fibers and casein fiber staples into a cone; and wet shrink-

ing the cone, to form a hat body ready for final blocking and finishing.

13. A method of making hat bodies including the steps of preparing fur for felting; preparing long casein fibers between 10 to 30 microns in diameter on the acid side between 2 and 5 pH; removing the snubs and noils, and separating said long casein fibers; cutting the long casein fibers into ¼ to 1 inch staples; blending the fur and the casein staples; forming the blended fur and casein fibers into a cone; and wet shinking said cone.

14. A method for making a body for a hat characterized by a feel, strength and durability superior to and/or substantially equivalent to an all-fur felt hat, which method includes the steps of preparing the fibers for felting; preparing casein fiber staples, substantially all of said staples having a pH of from 2 to 5, a diameter of from 10 to 30 microns, and a length of from ¼ to 1 inch; forming a blend comprising 25% to 95% by weight of fur fibers and 5% to 75% of said casein fiber staples; forming the blended fur fibers and casein fibers into a cone; and wet shrinking the cone to form a hat body ready for final blocking and finishing.

15. A method for making a body for a hat characterized by a feel, strength and durability superior to and/or substantially equivalent to an all-fur hat, which method includes the steps of preparing fur fibers for felting; preparing casein fiber staples; blending the fur fibers and casein fiber staples; forming the blended fur fibers and casein fiber staples into a cone; and wet shrinking the cone to form a hat body ready for final blocking and finishing.

16. As a new article of manufacture, a novel hat body meeting the standards of an all-fur felt hat body, including the characteristics of feel, texture, appearance, wet and dry strength, and wearing qualities, said novel hat body including a fur mix characterized by an admixture of fur fibers and casein fiber staples thoroughly intermingled and felted together, said casein fiber staples being characterized by their ability to hold up against wet working with hot water.

17. A felt hat made of fabric having 25% to 95% by weight of fur and 5% to 75% by weight of casein fiber staples intermingled and felted together, said casein fiber staples being characterized by their ability to hold up against wet working and also finishing operations.

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CERTIFICATE OF CORRECTION.

Patent No. 2,322,254. June 22, 1943.

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 9, strike out "per"; page 2, first column, line 26, strike out "not"; page 4, first column, line 31, for "means" read --mean--; and second column, line 49, claim 10, after the word "fibers" insert --for--; page 5, first column, line 11, claim 13, for "shinking" read --shrinking--; line 17, claim 14, for "the fibers" read --fur fibers--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 3rd day of August, A. D. 1943.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.