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TREATMENT OF SKINS, PELTS, HIDES, AND LEATHERS

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5 Claims. (Cl. 149—6)

This application continues the subject matter of my prior copending application Serial No. 557,949, filed August 18, 1931.

The present invention relates to processes of treating skins, pelts, hides and leathers and to the treated products resulting from such processes, and it particularly relates to the improvement of leathers, pelts and skins generally, especially when they are in part or whole of poor value or inferior grade.

An object of the invention is to obtain improved skins, pelts, hides and leathers generally, and especially to obtain better grades of leather from relatively poor grades of skins, pelts, and hides by an inexpensive chemical processing operation and by permanently incorporating in their body materials of generally the same composition or chemical structure.

Another object is to obtain products of increased grade and quality from hides, skins and pelts which are of relatively low grade and quality because of disease, degeneration and/or under-development, which products will be of sufficient value to justify the expenditure incurred in the tanning process.

Other objects are in part obvious and in part pointed out hereinafter.

In a preferred manner of carrying out the present invention, the skins, pelts, hides and leathers are impregnated and incorporated with cleavage and decomposition products of, or derived from, protein materials, preferably of the same general character as the materials to be treated or to be improved. Then after such impregnation or incorporation the cleavage or decomposition products are permanently fixed in position within the body or structure of the skin, pelt or leather by suitable coagulating or tanning treatments.

Desirably, the cleavage or decomposition products consist in part or whole of amino-acid materials preferably derived by hydrolyzing proteins, in which the decomposition products have been split to such a degree that they have a substantially smaller average molecular aggregate than glue or gelatin, and so that they in general are substantially less colloidal and tend to be crystalloid.

These amino-acid cleavage or decomposition products are preferably prepared by subjecting waste pieces of hide, leather scraps, or other suitable protein waste material to a process of hydrolysis after they have been cleaned by washing, dehairing, deliming, and so forth. The process of acid hydrolysis is carried out to such an

extent that the reaction products or solution has been carried substantially beyond the glue or gelatin stage and preferably the resultant product should form crystallizable bromine addition products. The preferred decomposition product should also be of such a character that substantially more than 10% of the nitrogen content thereof should have been converted into a form which is titratable with formalin or an aqueous solution of formaldehyde. Usually about 33% of the nitrogen is so titratable, the nitrogen usually constituting about 15% of the total solids of the preferred decomposition product.

The resultant amino-acid solution may be applied to the hides, pelts or leathers before or after tanning thereof, and the solution may be brushed onto the material to be treated, particularly if there are isolated portions or spots which are to be improved. More preferably the skin, pelt or leather may be placed in the solution, and treated, while in said solution, in a fulling mill.

After thorough impregnation of the material with the amino-acid solution and after thorough incorporation of the soluble protein decomposition products with and into the skin, pelt or leather, the impregnated product is tanned or similarly treated.

As a specific example of one procedure of carrying out the present invention, the leather scraps or other similar protein scrap materials may be first freed from lime with a solution of hydrochloric acid of about 1% strength.

Then the hydrolysis of the protein material to amino-acids is effected by treatment with sulphuric acid for 5 to 6 hours under a reflux condenser. The hydrolyzed product is then filtered away from the fat residue, the sulphuric acid is removed and the amino acid solution is concentrated in a vacuum to about 25 degrees Bé.

As a result of this vacuum evaporation, a viscous brown mass containing about 16% nitrogen will be obtained, which mass will quickly solidify upon further concentration. The dry weight of the cleavage or decomposition product so produced will amount to about 12% by weight of the delimed leather scraps originally used, and this dry substance upon incineration will leave substantially no residue. The yield of fat as a result of this hydrolysis process is usually about 3%.

This decomposition product preferably in concentrated solution may then be added either to sheared skin before tanning, or to leather after tanning. About 12 liters of a 25 degrees Bé. solution, containing about 5½ kg. of the dry de-

composition product, may be added to 150 kg. press weight of finished tanned leather, in a fulling mill and the mixture may be treated therein for about 10 minutes at room temperature. At the end of this period the amino-acid decomposition products will have been in large part or substantially completely absorbed by the leather. The leather so treated may then be dressed in the usual manner and tanned.

- 10 If dehaired parts are utilized, which have just been pressed out after shearing, the treatment may be carried out for about $\frac{1}{4}$ hour.

The improved product of the present process is most satisfactory when the protein decomposition products of the treating solution or baths have been broken up to simpler and smaller molecular aggregates than are characteristic of glue, gelatin, albumoses, peptones, globulines and fibrines. The preferred albuminous decomposition substance should have about a 15% nitrogen content. These materials appear to possess a higher and greater penetrative and impregnating power than larger molecular aggregates and materials of lesser nitrogen content. Because of the high penetrating and impregnating power of these treating solutions the fulling process may be greatly shortened with the result that damage to the grain layers because of prolonged fulling is precluded.

- 30 The treating process of the present invention is especially desirable inasmuch as it puts a neat finish on the inside or flesh surface of the leather, skin or pelt, which dispenses with the need for repeated handling or washing of the leather. The final product produced not only has the excellent appearance characteristic of good grades of leather, but also has a chemical composition which does not substantially deviate from normal leather.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. A process of treating defective hides, skins, pelts and leather, which comprises impregnating them with a solution of an albuminous substance resulting from the acid hydrolysis of leather scrap or waste, which hydrolysis has been carried on until the substance has a content of nitrogen of which at least 10% is titratable with formaldehyde.

2. A process of improving hides, skins, pelts and leather, which comprises treating them with a decomposition product of an albuminous substance which will yield crystallizable bromine derivatives.

3. A process of improving hides, skins, pelts and leather, which comprises treating them with a solution of an albuminous decomposition product including amino acids and which has a nitrogen content of which at least 10% is titratable with formaldehyde and which can yield crystallized bromine addition products.

4. A process for the impregnation of hides, skins, pelts and leather, which comprises treating them with a solution of an albuminous decomposition product, the formal nitrogen content of which amounts to more than 10% of the total nitrogen content.

5. A process of treating hides, skins, pelts and leather, which includes hydrolyzing delimed leather scrap with sulphuric acid, evaporating in a vacuum to about 25° Baumé to produce a product of about 16% nitrogen content, and treating, the leather, skins, hides or pelts with a solution of such product.

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