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LEATHER MANUFACTURE

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5 Claims. (Cl. 149—5)

The invention relates to a new method of converting hides and skins into leather of high quality and includes within its scope both the new method and the improved leather produced thereby.

I have discovered that untanned hides and skins may be directly converted by a one stage process into pure white, full, plump, suede or grain leather by treatment with a methylol melamine in the manner to be hereinafter described. The process may be employed to convert into leather all types and kinds of untanned fish, bird, reptile or animal skins in their bated, drenched or pickled condition. For purposes of brevity such hides and skins will be designated hereinafter in the specification and claims by the generic term "skins."

The methylol melamines which I employ in my process are known chemical compounds produced by the reaction of 1 mole of melamine with 2–6 moles of formaldehyde. The methylol melamine condensation product should be water-soluble, and accordingly, each molecule of melamine should be combined with at least two and preferably three or more molecules of formaldehyde. Heating the product during its preparation for an excessive length of time should be avoided since polymerization of the compound readily occurs and the more highly polymerized methylol melamines are water-insoluble. Also since skins are ordinarily treated in the preliminary steps of the tanning process with large quantities of salt, it is desirable that the methylol melamine be water soluble in the presence of salt. Since aqueous dispersions of the higher polymers of methylol melamine are precipitated by salt the methylol melamines employed in my presence should for this reason also be prepared by methods which avoid excessive and prolonged heating during their preparation.

Preparation of a methylol melamine suitable for use in my new process may be accomplished by boiling one mole of melamine with about 3.5 moles of aqueous 30% formaldehyde having a pH of 9.0 for about 20 minutes followed by cooling, separating and drying the resulting crystals. These methylol melamine crystals may be readily dispersed in hot water. If desired, a solution of methylol melamine directly usable as a tanning liquor may be prepared by heating the melamine and formaldehyde and omitting the step of separating the product from its mother liquor.

The actual steps of converting untanned skins into leather by my process are simple and consist principally in the impregnation of the untanned skin with the aqueous dispersion of methylol melamine. The process may be conducted by merely immersing the skins in vats containing the methylol melamine dispersion for a suitable period of time or by drumming or by treatment in other conventional equipment found in the tannery.

The amount of methylol melamine required to tan skins satisfactorily depends on the condition of the skin, the degree of tanning required and also on the subsequent use for which the leather is intended. Ordinarily from 3–10% by weight of the dry methylol melamine based on the drained and pickled weight of the hide will be satisfactory for most tanning requirements. However, when employed in conjunction with other tanning agents it may be necessary to use only 1 or 2% of methylol melamine. To secure special effects it may be desirable to use as much as 20% of methylol melamine based on the weight of the skins being processed.

The length of time required to secure a satisfactory tanning of the skin also varies somewhat but is very much shorter than the time required when using vegetable tanning extracts. In some cases the tanning effect of the methylol melamine is noticeable after treating the skins for only one hour. Since thickness of the skin is one of the major factors determining the length of time required for the methylol melamine dispersion to thoroughly diffuse into its interior and as different kinds of skin vary considerably in thickness it will be seen that it is not feasible to set a definite length of time for the skin to remain in contact with the tanning liquor. Ordinarily satisfactory tanning is accomplished within a 24 hour period with most skins. The desired degree of tanning can be easily determined by the tanner by empirical methods well known in the art.

When treating pickled skins, the pH of the liquor will in many cases be found suitable without further adjustment but in some cases particularly when treating bated skins it may be necessary to adjust the pH of the liquor to a value within the range of 3.0–5.0 with sulfuric, hydrochloric, acetic or other suitable acids, at least during the final stages of the tanning process so that the methylol melamine will be in a medium favoring its polymerization.

When the skins have been tanned to the desired stage they may be removed from the liquor, drained, neutralized, washed and fatliquored in the conventional manner. As a result of the treatment the skins will be found to be pure

white, full, plump and well tanned. The leather is especially well suited for white shoe uppers, handbags and in the production of novelties requiring a uniformly pure white, soft, full, suede or grain leather. It will also be found that leathers so produced are extremely stable to the yellowing effects of sunlight and remain white under conditions which would normally turn leathers produced by other methods an undesirable, yellowish color.

My invention will now be described in greater detail by means of the following specific examples. It should be understood however, that these are given primarily by way of illustration and are not intended to be in limitation of the invention as defined by the appended claims. In these examples the parts are by weight and, unless otherwise stated, based on the drained weight of the pickled skins.

Example 1

Four halves of pickled calfskins weighing 3550 g. were drummed for 15 minutes in 3550 g. of a 5% solution of NaCl and 225 g. of a 33% aqueous solution of trimethylol melamine was then added and the drumming continued 30 minutes at which time the liquor had a pH of 3.7. Another 225 g. of the 33% solution of trimethylol melamine was added and the drumming continued 30 minutes longer at which time the liquor had a pH of 4.1. An additional 225 g. of the 33% solution of trimethylol melamine was added and the drumming continued for another 30 minutes at which time the solution had a pH of 4.5 and the leather was becoming slightly tanned. A final portion of 112 g. of the trimethylol melamine solution was added and the drumming continued for 2 hours. Two of the halves were removed from the drum and horsed up. The others were allowed to lie in the drum overnight. The skins were then washed for 10 minutes at 95° F. and fatliquored 30 minutes at 45° C. with 6% of a sulfonated vegetable oil. The skins were then set out and dried overnight. As a result of this treatment a white, soft, full, well-tanned leather was obtained.

Example 2

100 parts by weight of pickled calfskins were drummed for 15 minutes with 60 parts by weight of water at 70° F. and 10 parts by weight of salt. 10 parts of trimethylol melamine dissolved in 40 parts of water was added to the drum in 5 portions at 15 minute intervals. After the last addition of trimethylol melamine the drumming was continued for one hour at which time the solution had a pH of about 4.0. The solution was then adjusted to a pH of 3.3–3.7 by the addition of 0.1% sulfuric acid. The stock at this time had a slightly tanned feel. Drumming was continued for a total drumming period of 24 hours. The stock was then removed, drained, washed and fatliquored as described above. The skins were of a white uniform color, soft and full with an even close grain.

Example 3

A limed side was split to 12 oz. and divided into two portions, washed 10 minutes at 70° F., drained, and washed to 90° F. The skin was then bated with 1% of a commercial enzyme bate in a short liquor. The skins were drummed 30 minutes, washed 15 minutes at 70° F. and drained. One piece of the skin was left in the bated condition and the other was pickled in 200% water, 10% NaCl and 2% H_2SO_4 for one hour at a pH of approximately 1.9.

The pickled skin which had weighed 2950 g. in the limed condition was placed in a drum with 75% of its weight of water and 5% NaCl and drummed for 15 minutes. 5% (based on the limed weight of the skins) of trimethylol melamine in 25% of water was added to the drum and the skins drummed for 18 hours at which time the liquor had a pH of 3.7. Disodium phosphate, 29.5 g., was then added and the skins drummed for one hour after which they were washed in cold water for 15 minutes. After washing, the skins had an average shrink temperature of 147° F., a pH of 4.7 on the grain and a pH of 4.0 inside.

The sample of bated skin which had weighed 2950 g. out of the lime was placed in a drum with 70% water containing 5% salt and drummed for 15 minutes. 5% trimethylol melamine in 25% water was added in one feed and the skins drummed for 45 minutes at which time the liquor had a pH of 8.2. One-half percent of diluted H_2SO_4 was then added and the drumming continued for another hour at which time the pH of the solution was 5.2. Diluted H_2SO_4 was then added to bring the pH down to 3.9. The drumming was then continued for about 18 hours at which time the liquor had a pH of 4.0 and the skins had a shrink temperature of 165° F. One percent of disodium phosphate was added and the skins drummed for one hour after which they were washed in cold water for 15 minutes. A uniformly pure white, full, plump, well tanned leather was obtained.

Example 4

One-half dozen pickled domestic sheepskins weighing 6½ pounds were placed in a drum with 2 gallons of 10% NaCl solution and drummed for 15 minutes. 2% (based on the weight of the pickled skins) of trimethylol melamine in a 33% aqueous solution was added and the skins drummed 30 minutes at which time the liquor had a pH of 3.5. An additional 8% of trimethylol melamine was added to the drum in 3 feeds at 30 minute intervals at which time the liquor had a pH of 5.0 and the skins were showing signs of being tanned. Another 5% of the trimethylol melamine was added and the drumming continued for 1.5 hours at which time the skins had a good full tannage and a shrinking temperature of 155° F. Another 5% of trimethylol melamine was finally added and the drumming continued for 30 minutes at which time the skins were very white, full, completely penetrated and well tanned. After another hour of drumming the skins had an average pH of 5.5 and a shrinking temperature of 170° F.

The drum was then drained and the skins washed for 15 minutes gradually raising the temperature to 125° F. The drum was drained and put on good float at 125° F. and fatliquored with 7% of a sulfonated vegetable oil. After 30 minutes drumming 2% colloidal clay, 1% lithopone, 1% Italian talc and 1% white clay were added to the drum and the skins drummed with the pigments for 10 minutes. They were suede-wheeled and horsed up overnight, then dried and dry staked. The skins were full, white, pliable, completely penetrated and well tanned.

I claim:

1. The process of preparing leather which comprises impregnating untanned skins with an aqueous dispersion of a methylol melamine.

2. The process of preparing leather which comprises impregnated untanned skins in an aqueous dispersion of a water soluble, salt-stable trimethylol melamine until the skin has become tanned.

3. The process of preparing leather which comprises impregnating untanned skins with 3 to 10% of their weight of a water soluble, salt-stable methylol melamine in aqueous solution at a pH between 3.0 and 4.5 and leaving the skins in contact with the liquor until they have become well tanned.

4. Leather containing uniformly distributed throughout its structure a methylol melamine polymer.

5. A uniformly white, full, plump leather containing distributed throughout its structure the condensation product formed upon impregnating an untanned skin with a water dispersible dry methylol melamine.

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