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METHOD OF CHROME TANNING OF LEATHER

Thomas Blackadder, St. Davids, Pa., assignor to Röhm & Haas Company, Philadelphia, Pa.

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This invention relates to a novel and highly advantageous process of chrome tanning of leather.

When pelts are converted to leather by tanning with the aid of compounds of chromium two general methods are followed for the purpose of effecting the conversion. Firstly, the pelts after proper processing to remove hair and other extraneous matter are soaked in a solution of chromic acid which is taken up and later reduced in situ by immersing the pelt in a reducing bath, commonly a solution of hyposulphite or of bisulphite of sodium; or secondly, the pelts after proper processing are pickled, that is steeped in a solution of acid and salt and then immersed in a solution of a chromium salt, e. g., of chrome alum or of a partially basic chromium sulphate prepared by reducing sodium bichromate with glucose in presence of sulphuric acid or with sulphur dioxide or other suitable reducing agent.

In both methods the object in view is the presentation to the hide substance of a chromic salt in a suitable degree of basicity so that combination occurs between the hide substance and the basic chrome salt.

With the first method we are not at present concerned. In the second method it is common knowledge that, when the pelts after proper processing are brought in contact with the chromic salt solution, these chromic salts must be of sufficient acidity to prevent immediate combination to any appreciable degree as otherwise a tanned condition would be set up on the outer surfaces of the pelt which would prevent proper penetration of the chromic salt to the inner parts. This is taken care of in practice by pickling the processed raw pelts, prior to their treatment with a partially basic chromic salt; or by the use of a fully acid chrome salt such as chrome alum. In order now that true tannage may occur it is necessary to reduce the acidity of the chromic salt in contact with the pelt. This is accomplished generally by the addition to the chromic salt solution, still containing the pelts, of an alkali such as soda ash or bicarbonate of soda or of borax. It has also been suggested to add a potential source of alkali such as hexamethylene tetramine or other aldehyde ammonia compounds.

According to the present invention the reduction in acidity is caused in a unique and very convenient manner by the addition to the chromic salt solution, still containing the pelts, of a salt of an acid which will combine with the hide substance.

Acids which combine with hide substance, in other words "tanning acids" comprise a variety of acids which have the common feature of combining with hide substance and rendering it imputrescible. Among these acids there are several distinct groups namely, natural tanning acids present in vegetable extracts, typified by "tannic acid"; the condensed sulfonic acids of aromatic hydrocarbons or of phenols, typified by dinaphthyl methane disulfonic acid or by diphenylol methane disulfonic acid; condensation products of polyhydric phenols with dibasic acids typified by the condensation product of oxymethylene salicylic acid and resorcinol; individual acids such as picric acid.

For my purpose salts of aromatic sulfonic acids are particularly suitable, altho other acid bodies can also be used. These acids have a very strong affinity for hide substance. The type of acid is not of major importance, so long as the acid shows an affinity for the hide substance markedly greater than the affinity shown by inorganic acids such as hydrochloric, sulphuric or phosphoric. The type of base combined with the acid in the form of a salt may be either an alkali such as potassium, sodium or ammonium, or an alkali earth such as calcium. The preferred alkali earth is calcium, but barium and strontium, although they give inferior results, may also be employed.

The essential feature of the invention is that by introducing a salt of the type mentioned we obtain a source of free alkali. The free alkali arises from the fact that a combination of the acid with the hide substance leaves the base which was previously associated with the organic acid free to neutralize sulfuric acid which was previously combined with the chrome. The chromic salt is thus rendered more basic and in consequence of this is able to tan the pelts completely. At the same time the organic acid gives a supplementary tannage.

The invention is illustrated by the following examples, but it is understood that it is not confined thereto.

Example 1

100 lbs. of bated calfskins are pickled in
1 lb. sulphuric acid
10 lbs. salt
12 gals. water.

Depending on the alkalinity of the bated skins the amount of acid may be varied several ounces in order that the pickled skins may show a pH value between 3½ and 4. To the skins, still in the pickle liquor, add 1 gallon of a partially basic chromic sulphate solution containing between

1½ and 1¾ lbs. chromic oxide in the form of a basic sulphate of 60% acidity by the Schorlemmer scale. The calfskins are agitated in this liquor until the chomic salt has penetrated, whereupon 5 gals. of a solution of the sodium salt of dinaphthyl methane disulphonic acid containing 2 lbs. of the dry salt is added. Agitation is continued for a further period of one to two hours. The skins may lie in the liquor overnight or be piled down overnight and then washed with water when it will be found that they are very evenly tanned throughout.

Example 2

100 lbs. of pickled sheepskins showing a pH of less than 3½, as is normally the case with sheepskins from either domestic or foreign pulleries, are agitated in 10 gals. of a 5% brine solution and soda ash added, a few ounces at a time until the pH value of the skins is between 3½ and 4.

To the skins, still in the brine, add 1 gal. of a partially basic chromic sulphate solution containing between 1½ and 1¾ lbs. chromic oxide in the form of basic sulphate of 60% acidity by the Schorlemmer scale.

The skins are agitated until the chromic sulphate has penetrated whereupon 5 gallons of a solution of the sodium salt of diphenylol dimethyl methane monosulphonic acid containing 2 lbs. of the dry salt is added.

Agitation is continued for two hours longer and the skins are left in the liquor for a further period of eight hours and then washed with water. The skins will then be found to be thoroughly tanned.

Example 3

100 lbs. of bated calfskins are pickled and penetrated with partially basic chromium sulphate as described in Example 1. Whereupon 5 gallons of a solution of the sodium salt of Benzyl naphthalene sulphonic acid containing 2 lbs. of the dry salt is added and agitation continued for 2 hours. The skins are then piled on a horse overnight and well washed the following morning with water when they will prove to be thoroughly tanned.

Example 4

100 lbs. kidskins are pickled and penetrated with partially basic chromium sulphate as described in Example 1, whereupon 5 gallons of a solution of the calcium salt of dinaphthyl methane disulphonic acid, containing 2 lbs. of the dry calcium salt is added. Agitation is continued for a further period of one to two hours. The skins may lie in the liquor overnight or be piled down overnight and then washed with water when it will be found that they are very evenly tanned throughout.

Example 5

100 lbs. of calfskins are pickled and penetrated with partially basic chromium sulphate as described in Example 1, whereupon 5 gallons of a solution of the potassium salt of diphenylol methane disulphonic acid containing 1½ lbs. of the dry potassium salt is added. The skins are agitated for a further period of two hours and piled on a horse overnight and then well washed when it will be found that they are fully tanned.

Example 6

500 lbs. of bated steer hides are pickled with 5 lbs. sulphuric acid and 50 lbs. salt in 60 gallons water to show a pH between 3½ and 4.

To the skins in this liquor is added 5 gallons of a partially basic chromic sulphate solution containing between 9–9½ lbs. chromic oxide in the form of basic sulphate of 60% acidity by the Schorlemmer scale.

The skins are agitated until the chromic sulphate has penetrated, whereupon 25 gallons of a solution of the sodium salt of diphenylolmethane disulphonic acid containing 10 lbs. of the dry salt is added. Agitation is continued for a further period of one to two hours. The skins may lie in the liquor overnight or be piled down overnight and then washed with water when it will be found that they are very evenly tanned throughout.

Example 7

100 lbs. of pickled sheepskins are penetrated with partially basic chromic sulphate as described in Example 1, whereupon 5 gallons of a solution of the ammonium salt of diphenylol-monomethyl-methane disulphonic acid containing 2 lbs. of the dry salt is added. Agitation is continued for a further period of one to two hours. The skins are piled on a horse overnight and well washed the following morning when they should be fully tanned.

Example 8

100 lbs. of bated calfskins are pickled and penetrated with partially basic chromic sulphate as described in Example 1, whereupon 5 gallons of a solution of the sodium salt of the product of condensation of oxymethylene salicylic acid and resorcinol in slightly acid solution, containing 2½ lbs. of the dry salt is added. Agitation is continued for a further period of one to two hours. The skins are piled on a horse overnight and well washed the following morning when they should be fully tanned.

Example 9

100 lbs. of pickled sheepskins shown a pH of 3½–4 are agitated in a drum in 10 gals. of a 5% brine solution and 1 gal. of a partially basic chromic sulphate solution added containing between 2 and 2¼ lbs. chromic oxide in the form of basic sulphate of 60–67% acidity by the Schorlemmer scale.

The skins are agitated until penetration is complete, then 5 gals. of a solution of sodium picrate containing 2 lbs. of the dry salt is added.

Agitation is continued for 2 hours longer and the skins are left in the liquor for a further period of 8 hours, then washed with water, when they will be found to be thoroughly tanned.

Example 10

100 lbs. of pickled sheepskins are penetrated with a partially basic chromic sulphate solution as described in Example 9, then 5 gals. of a solution of the sodium salt of tannic acid containing the equivalent of 2 lbs. of tannic acid is added. Drumming is continued for 2 hours longer, and the skins left in the liquor for a further period of 8 hours, then washed with water, when they will be found to be thoroughly tanned.

It is understood that the invention is in no way to be confined to the specific examples given but that wide deviations are possible without departing from the spirit of the invention, the scope of which is to be determined only by the claims which follow. No modification is claimed to the exclusion of any other modification.

What I claim is:

1. In a process of chrome tanning the step which comprises the application to the hide, previously treated with a partially basic chromic salt, of the potassium salt of diphenyloldimethylmethane mono sulphonic acid.

2. In a process of chrome tanning the step which comprises the application to the hide, previously treated with a partially basic chromic salt, of the sodium salt of dinaphthylmethane disulphonic acid.

3. In a process of chrome tanning the step which comprises the application to the hide, previously treated with a partially basic chromic salt, of the calcium salt of dinaphthylmethane disulphonic acid.

4. In a process of chrome tanning, the steps which comprise immersing hides and skins in a bath containing a partially basic chrome salt and thereafter adding to the bath, one of the group consisting of alkali and alkali earth salts of a synthetic tanning acid.

5. In a process of chrome tanning, the steps which comprise immersing hides and skins in a bath, containing a partially basic chrome salt and thereafter adding to the bath, one of the group consisting of alkali and alkali earth salts of a tanning acid.

6. In a process of chrome tanning, the steps which comprise immersing hides and skins in a bath containing a partially basic chrome salt and thereafter adding to the bath, one of the group consisting of alkali and alkali earth salts of an aromatic sulphonic acid.

7. In a process of chrome tanning, the steps which comprise immersing hides and skins in a bath containing a partially basic chrome salt and thereafter adding to the bath, one of the group consisting of alkali and alkali earth salts of a hydroxy aromatic sulphonic acid.

8. In a process of chrome tanning, the steps which comprise immersing hides and skins in a bath containing a partially basic chrome salt and thereafter adding to the bath, one of the group consisting of alkali and alkali earth salts of a condensed aromatic sulphonic acid.

9. In a process of chrome tanning, the steps which comprise immersing hides and skins in a bath containing a partially basic chrome salt and thereafter adding to the bath, one of the group consisting of alkali and alkali earth salts of a condensed naphthalene sulphonic acid.

10. In a process of chrome tanning, the steps which comprise immersing hides and skins in a bath containing a partially basic chrome salt and thereafter adding to the bath, one of the group consisting of alkali and alkali earth salts of a condensed phenol sulphonic acid.

11. In a process of chrome tanning, the steps which comprise immersing hides and skins in a bath containing a partially basic chrome salt and thereafter adding to the bath, one of the group consisting of alkali and alkali earth salts of diphenyloldimethylmethane mono sulphonic acid.

12. In a process of chrome tanning, the steps which comprise immersing hides and skins in a bath containing a partially basic chrome salt and thereafter adding to the bath, one of the group consisting of alkali and alkali earth salts of a dinaphthylmethane disulphonic acid.

THOMAS BLACKADDER.