

UNITED STATES PATENT OFFICE

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METHOD OF TANNING HIDES AND SKINS

No Drawing.

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This invention relates to the tanning of hides and skins. While it is exemplified herein by reference to the two-bath method of tanning by chromium and other similar mineral compounds, it is to be understood that the invention and various important characteristics thereof may have other applications and uses.

In the two-bath method of tanning hides and skins with mineral tanning substances, as heretofore practised, the hides or skins were dumped into the first bath solution in a drum or otherwise treated in a similar solution in a vat or tank until thoroughly permeated with the solution. After the usual draining of the hides or skins thus treated, they were then dumped into a drum with a reducing agent in solution and drummed for a period sufficient to insure complete penetration by such reducing agent. It will be observed that no precaution was taken to secure the hides or skins against shrinking during the application of the reducing agent. Furthermore, no attempt was made to tan these hides or skins in such manner as to secure any definite footage from the hides or skins thus treated.

Objects of the invention are to hasten tanning operations and to secure greater footage from the hides and skins being tanned, while at the same time obtaining a better quality of leather. Another object of the invention is to utilize tanning material more efficiently by eliminating a considerable amount of the waste heretofore considered necessary.

To these ends and in accordance with an important characteristic of the method, the hides or skins are subjected to treatment by a tanning agent which does not, of itself, effect a tanning operation and are then stretched out in fully extended condition upon a supporting surface and maintained in said stretched out condition during the application of a substance or substances effective in conjunction with the tanning agent first applied to cause tanning of the hide or skin, the hide or skin being maintained in its fully extended condition after the application of the second tanning agent until the fibers have set in extended condition. By this method

an increased area is secured over the methods heretofore generally practised in the tanning of hides and skins for the reason that the hide or skin is maintained in extended condition until it is set by the tanning agents whereby it will not substantially shrink when later subjected to other tanning or finishing operations. Conveniently the stretching out of the hide or skin upon a supporting surface is accomplished by a slicking operation which not only stretches the hide or skin but removes the desired amount of the watery contents of the hide or skin including the watery content of the first-applied tanning solution. The new and improved method of tanning which involves the spreading or stretching out of the hide or skin upon a supporting surface, and the removal of a large proportion or, in some cases, the larger portion, of the watery content of a hide or skin, prior to any tanning of the hide or skin, and also the maintenance of the hide or skin in spread out or stretched out condition until the hide or skin has set in such extended condition, is described and claimed in my copending application Serial No. 402,319, filed October 24, 1929, and hence will not be claimed herein.

Since the tanning solution first applied, though a tanning agent, does not effect tanning of the hide or skin, such solution may be applied in a vat or drum or by other means with the hides or skins in mass in a considerable amount of the solution. Upon removal from this solution, the hides or skins may be as readily stretched out to their full natural extent as if they had not received such treatment. Hence, the treatment of the hides or skins in mass in a vat or drum, has no deleterious effect upon either the area or the quality of the finished product. After the hide or skin has been stretched out in extended condition and a large portion of its watery content removed, a measured amount of the second tanning agent is applied in a substantial film all over the exposed surface of the stretched out hide or skin and allowed to act until the hide or skin is set in such extended condition. This takes place very quickly, due largely to the prior removal of a large proportion of the watery content

of the hide or skin. The hide or skin may then be finished according to any of the well-known methods employed by tanners.

In practice, hides or skins, but more particularly sheep skins, will usually be subjected to a soaking operation in salt solution of about 40° Bkr., since this operation is found to prepare them advantageously for subsequent tanning operations. The hides or skins coming from such a solution are moderately plump and of a texture and feeling similar to those of fresh hides or skins.

The hides or skins are then placed in a drum containing about twenty gallons of chrome liquor per hundred pounds of hides or skins. This first tanning agent consists of a water solution of about five per cent of bichromate of potash and two and one-half per cent of concentrated hydrochloric acid reckoned on the net weight of the hides or skins to be treated. The drumming is continued for approximately two hours, depending upon the strength of the solution used. At the end of this period, the hides or skins are thoroughly permeated with the chrome substance. However, they are not tanned but are still soft, flexible and extensible. The reason for this resides in the fact that a chrome solution like that specified above is non-tanning. It requires the addition of another substance or substances to fix the chrome on and in the fibers of the hide or skin.

While it is preferred to use the first-bath chrome solution described in the foregoing paragraph, it has been found desirable in tanning operations upon certain classes of stock as, for instance, sheep-skins, to use a chrome solution which contains a small amount of a reducing agent for the chrome. This solution would tan the hide or skin if left to act long enough in sufficient quantity. But the quantity is calculated to effect only a partial tanning of the hide or skin substance so that the hide or skin is still soft, flexible and extensible. The advantage of the solution just described is that the reducing agent, when subsequently applied in quantity as hereinafter described, effects a prompt and thorough tanning of the hide or skin.

After the drumming operation, the hides or skins are piled up to drain and are then slicked-out individually with the grain surface resting upon a smooth work supporting surface. This slicking is performed in a thorough manner either by hand slickers or by a machine provided for the purpose so as to secure the full natural area of a hide or skin and to put-out a large portion, approximately one-half, of the water content of the hide or skin.

Subsequently to the stretching of the hide or skin and to the removal of the proper amount of water, each hide or skin is main-

tained in extended condition upon a smooth work supporting surface during the application of a second tanning agent, in this case a reducing agent, which in conjunction with chrome solution operates to effect tanning of the hide or skin. For this purpose there is employed a solution of sodium thiosulphate, often called hyposulphite of soda or, more briefly, "hypo", in a substantial amount, about 10% of the net weight of the hides or skins, with enough hydrochloric acid to insure an acid condition in the solution, the "hypo" being distributed uniformly over the flesh surface of the chromed hide or skin, the latter remaining in its fully stretched out condition until the "hypo" has penetrated the hide or skin in an amount sufficient to combine with the previously applied chromium salt which is thoroughly distributed throughout the hide or skin substance. The application of the "hypo" results in the tanning of the hide or skin through certain chemical changes in the chromium bichromate which it is not necessary to specify since text books may be readily found which will give the chemical reaction. In the case of thicker hides and skins several applications of "hypo" will have to be made in order to insure completion of the tanning operation.

However, after an interval which may be as short as two or three minutes, in case of thin, light skins, it is preferred to remove the hide or skin from the work support where it was only partially tanned in extended condition and to subject it while in extended condition to the action of a "hypo" solution of about 70° Bkr. for a period varying from fifteen minutes to one hour, although it may be left over night in the "hypo" solution. Preferably, the hides or skins while thus being treated are in a shallow vat containing the "hypo" solution, the hides or skins being placed in the solution in the vat one at a time so that both surfaces of each hide or skin are thoroughly wetted by the "hypo" solution. Here the hides or skins are not only tanned in fully extended condition but plumped so that the leather produced not only yields a higher footage than that obtained by the old methods but is distinguished by its softness, thickness and weight, having more "body" than leathers made by the former methods. Instead of the vat, a drum may be used if care be taken to see that the hides or skins are set in extended condition through a sufficient application of the "hypo" solution while in such extended condition.

The leather is finished in accordance with any one of the old and well-known methods.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. That improvement in methods of tanning hides and skins which comprises subjecting hides or skins to treatment by a tanning agent

which in itself is non-tanning, stretching each hide or skin out in fully extended condition, treating each hide of skin while it is maintained in such fully extended condition with another tanning agent effective in conjunction with the tanning agent first applied to tan the hide or skin substance, such treatment being continued only long enough to set the hide or skin in extended condition, and then immersing the hide or skin in a solution of the second tanning agent.

2. That improvement in methods of tanning hides and skins which comprises subjecting hides or skins to treatment by a tanning agent, which in itself is non-tanning, until such agent has fully penetrated each hide or skin, then slicking-out each hide or skin in fully extended condition upon a smooth supporting surface, and treating the hide or skin while it is maintained in such fully extended condition with another tanning agent which in conjunction with the first-mentioned tanning agent effects tanning of the hide or skin.

3. That improvement in methods of tanning hides and skins which comprises subjecting hides or skins to treatment in a solution of a tanning agent which in itself is non-tanning, until each hide or skin has been fully permeated with such tanning agent, then slicking each hide or skin out in fully extended condition upon a supporting surface and simultaneously therewith removing a large proportion of the watery content of the hide or skin, applying a second tanning agent in a quantity sufficient in conjunction with the first-mentioned tanning agent to effect tanning of the hide or skin, and maintaining the hide or skin in its fully extended condition until it has been set in said condition through the operation of the tanning agents.

4. That improvement in methods of tanning hides and skins which comprises subjecting hides or skins to treatment by a tanning agent, which in itself is non-tanning, until each hide or skin is fully permeated with such tanning agent, removing from each hide or skin a large portion of its watery content, stretching each hide or skin out in fully extended condition, applying a second tanning agent which in conjunction with the first-mentioned tanning agent effects tanning of the hide or skin, and maintaining the hide or skin in its fully extended condition during the application of the second tanning agent and until the hide or skin has been set by the tanning agents in such fully extended condition.

5. That improvement in methods of tanning hides and skins which comprises subjecting hides or skins to treatment by a tanning agent, which in itself is non-tanning, until each hide or skin is fully permeated with such tanning agent, removing from each hide or skin a large portion of its watery

content, stretching each hide or skin out in fully extended condition, applying a second tanning agent to fix the first-mentioned tanning agent in and upon the fibers of the hide or skin to set the latter while the hide or skin is maintained in fully extended condition, and, as soon as the hide or skin has been sufficiently tanned to maintain its fully extended area, placing it in a solution of the second tanning agent until it is completely tanned.

6. That improvement in methods of tanning hides and skins which comprises subjecting hides and skins to treatment by a tanning agent while in mass in a tank or drum, said tanning agent being in itself non-tanning, stretching each hide or skin out in fully extended condition, applying to each hide or skin, while it is maintained in such fully extended condition, another tanning agent effective in conjunction with the tanning agent first applied to tan the hide or skin and then completing the tanning of the hide or skin and plumping it by treating in a solution of the second tanning agent.

7. That improvement in methods of tanning hides and skins which comprises drumming hides or skins in a tanning agent, which in itself is non-tanning, until such agent has fully penetrated each hide or skin, then stretching out each hide or skin in fully extended condition upon a smooth supporting surface, and applying to each hide or skin a solution of another tanning agent which in conjunction with the first-mentioned tanning agent effects tanning of the hide or skin while the latter is maintained in fully extended condition on said supporting surface.

8. That improvement in methods of tanning hides and skins which comprises drumming hides or skins in a solution of a tanning agent until each hide or skin has been fully permeated with such tanning agent, which in itself is non-tanning, then slicking that hide or skin out in fully extended condition upon a supporting surface, and simultaneously therewith removing a large portion of the watery content of the hide or skin, treating the hide or skin with a second tanning agent in a quantity sufficient in conjunction with the first-mentioned tanning agent to effect tanning of the hide or skin, and maintaining the hide or skin in its fully extended condition until it has been set and completely tanned in said condition through the operation of the tanning agents.

9. That improvement in methods of tanning hides and skins which comprises subjecting hides or skins in mass to treatment by a tanning agent, which in itself is non-tanning, until each hide or skin is fully permeated with such tanning agent, removing from each hide or skin a large portion of its watery content, stretching each hide or skin out in fully extended condition on a support-

ing surface, swabbing over the exposed surface of the hide or skin a second tanning agent which in conjunction with the first-mentioned tanning agent effects tanning of the hide or skin, and maintaining the hide or skin in its fully extended condition until the hide or skin has been set by the tanning agents in such fully extended condition.

10. That improvement in methods of tanning hides and skins which comprises treating hides or skins with a non-tanning chromium solution until each hide or skin has been fully permeated with the chromium solution, then stretching out the treated hide or skin in fully extended condition, applying to the fully extended hide or skin a reducing agent to complete tanning of the hide or skin by the chromium compound while said hide or skin is maintained in its fully extended condition, and then completing the tanning of the hide or skin and plumping it by treatment in a solution of the reducing agent.

11. That improvement in methods of tanning hides and skins which comprises treating hides or skins with a non-tanning solution of a mineral tanning agent until each hide or skin is fully permeated by the tanning agent, then stretching each hide or skin out in fully extended condition and simultaneously therewith removing a large proportion of the watery content of the hide or skin, and treating the hide or skin with a reducing agent in a quantity sufficient to fix the mineral salt first applied in and upon the fibers of the hide or skin to set the latter while the hide or skin is maintained in fully extended condition.

12. That improvement in methods of tanning hides and skins which comprises drumming hides and skins in mass in a non-tanning solution of a chromium salt, then stretching each hide or skin out in fully extended condition and simultaneously therewith removing a large proportion of the watery content of each hide or skin, and applying to the hide or skin a strong solution of sodium thiosulphate in a quantity sufficient to combine with the chromium salt in and on the fibers of the hide or skin to set and tan the latter while it is maintained in fully extended condition.

13. That improvement in methods of tanning hides and skins which comprises subjecting hides or skins to treatment by a tanning agent which in itself is non-tanning until each hide or skin is fully permeated with such tanning agent, removing from each hide or skin a large portion of its watery content, stretching each hide or skin out in fully extended condition on a supporting surface, applying a second tanning agent which in conjunction with the first-mentioned tanning agent effects tanning of the hide or skin while maintaining the hide or skin in its fully extended condition until

the hide or skin has been partially tanned by the tanning agents in such fully extended condition, and then placing the hide or skin in a solution of the second tanning agent while maintaining its extended condition, thereby to complete the tanning operation.

14. That improvement in methods of tanning hides and skins which comprises drumming hides or skins in a non-tanning chromium solution until each hide or skin has been fully permeated with the chromium solution, removing from each hide or skin a large portion of its watery content, stretching out the treated hide or skin in fully extended condition, treating the fully extended hide or skin with a reducing agent to fix the chromium in and upon the fibers of the hide or skin while said hide or skin is maintained in its fully extended condition, said reducing solution being allowed to act until the hide or skin is partially tanned in its fully extended condition, and then placing the hide or skin in a solution of the reducing agent in extended condition therein until it is completely tanned.

15. That improvement in methods of tanning hides and skins which comprises drumming hides or skins in a non-tanning solution of a metallic tanning agent until each hide or skin is fully permeated by the solution, stretching each hide or skin out in fully extended condition and simultaneously therewith removing a large proportion of the watery content of the hide or skin, applying a fixing agent in a quantity sufficient to fix the mineral tanning agent upon the fibers of the hide or skin to set the latter while the hide or skin is maintained in fully extended condition, and, as soon as the hide or skin has been sufficiently tanned to maintain its fully extended area, placing it in a solution of the fixing agent until it is completely tanned.

16. That improvement in methods of tanning hides and skins which comprises drumming hides or skins in a non-tanning solution of a metallic tanning agent until each hide or skin is fully permeated by the solution, stretching each hide or skin out in fully extended condition and simultaneously therewith removing a large proportion of the watery content of the hide or skin, applying a fixing agent in a quantity sufficient to fix the mineral tanning agent upon the fibers of the hide or skin to set the latter while the hide or skin is maintained in fully extended condition, and, as soon as the hide or skin has been sufficiently tanned to maintain its fully extended area, drumming it in a solution of the fixing agent until it is completely tanned.

17. That improvement in methods of tanning hides and skins which comprises subjecting hides or skins to treatment by a tanning agent, which in itself is non-tanning,

until such agent has fully penetrated each hide or skin, slicking out each hide or skin in fully extended condition upon a smooth supporting surface, applying another tanning agent which in conjunction with the first-mentioned tanning agent has the effect of tanning hide or skin substance, maintaining the hide or skin in fully extended condition on said supporting surface until partially tanned in such extended condition, and then completing the tanning of the hide or skin and plumping it by treatment in a solution of the second tanning agent.

18. That improvement in methods of tanning hides and skins which comprises subjecting hides or skins to treatment by a solution of a tanning agent, which in itself is non-tanning, until each hide or skin has been fully permeated with such tanning agent, then slicking that hide or skin out in fully extended condition upon a supporting surface, and simultaneously therewith removing a large proportion of the watery content of the hide or skin, applying a second tanning agent which in conjunction with the first-mentioned tanning agent has the effect of tanning hide or skin substance, maintaining the hide or skin in its fully extended condition until it has been set in said condition through the operation of the tanning agents, and then completing the tanning of the hide or skin thus treated and simultaneously therewith plumping it in a solution of the second tanning agent.

In testimony whereof I have signed my name to this specification.

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