

UNITED STATES PATENT OFFICE.

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TAWED SKIN AND PROCESS OF MAKING SAME.

SPECIFICATION forming part of Letters Patent No. 518,467, dated April 17, 1894.

Application filed January 23, 1893. Serial No. 459,441. (No specimens.)

To all whom it may concern:

Be it known that we, WILLIAM M. NORRIS, a resident of Princeton, Mercer county, New Jersey, and HENRY BURK, a resident of Philadelphia, Pennsylvania, citizens of the United States, have invented certain Improvements in Chrome-Tanned Leather and the Process of Tanning the Same, of which the following is a specification.

Our invention consists of improvements in chrome-tanned leather, and in the process of chrome tanning or tawing hides or skins, the object of our invention being to effect a complete reduction of the chromium compound, and so to render the product perfectly insoluble in water, and completely tan the hides or skins. We are thus enabled to completely tan the hide or skin and permit the stoppage of work upon the skins immediately after tanning, and before coloring and finishing, so that it is not essential as in the old process as at present employed, to immediately proceed with the operation of coloring and finishing after tanning, for during the interval between the tanning step and the coloring step, we allow the hide or skin itself to complete the tanning. The hides or skins at this point can be stacked up or stored, and in fact the beaming and tanning processes can be carried out in one factory, and the skins thus prepared can be sold as an article of manufacture to other manufacturers for coloring and finishing.

The beam work of our improved process is substantially the same as the beam work in the present chrome tanning process, and the tanning is substantially the same with the exception that the washing is omitted, and immediately after the skins are taken from the reducing bath, they are at once thrown into a solution of sulphate of alumina and chloride of sodium, or their equivalents (when the character of the reducing bath is such that chloride of sodium is formed and absorbed by the skins, the addition of chloride of sodium is omitted) and after remaining in this bath for a short time, they are removed and dried, and allowed to remain in this condition for a few weeks or longer.

Our invention particularly relates to this part of the process, and in order to more clearly explain the process we will give a de-

tailed description. We first tan or taw the skins by subjecting them to a bath of bichromate of potash or other analogous salt dissolved in water, to which an acid is added, such as hydrochloric or sulphuric acid, using for each one hundred pounds of raw hides or skins about five pounds of bichromate of potash or its equivalent, and two and one half pounds of hydrochloric acid, or its equivalent. The hides or skins are left in the above described bath until they have thoroughly absorbed the chromium compound. They are then removed and drained or pressed out and are then placed in the reducing bath. That reducing bath may contain, or be capable of evolving, sulphurous acid, hydrogen sulphide, tartaric acid, oxalic or other suitable acid, or any ferrous salt of iron, cuprous salt of copper or other suitable metallic salt, nascent hydrogen, or any other suitable reducing agent. The hides or skins are allowed to remain in the reducing bath until all the interaction between the chromium compound and the reducing agent has ceased, whereupon they are taken from the reducing bath, and, without washing, are at once thrown into a solution of sulphate of alumina, or its equivalent, and common salt (chloride of sodium). When the character of the reducing bath is such that chloride of sodium is formed and absorbed by the hides or skins during the action of said reducing bath, the salt is omitted from the sulphate of alumina solution. For example, when the reducing bath is composed of hypsulphite of soda and hydrochloric acid, the hydrochloric acid combines with the soda thus forming chloride of sodium (or common salt) which is taken up or absorbed by the hides or skins to a considerable extent. For each one hundred pounds of hides or skins about six pounds of sulphate of alumina and an equal amount of salt, may conveniently be employed. The hides or skins are allowed to remain in this sulphate of alumina solution for about two hours, when they are removed, hung upon hooks in a drying room, and allowed to become thoroughly dry. They then remain in this condition for about two weeks, or longer, when they are dampened or wet down, "staked," and the superfluous flesh removed, then "stained," "colored," "oiled off," "dried

out," and finished in the usual way. The usual process of "fat liquoring" may be omitted, as stock treated by our process is so soft, flexible and pliable, and at the same time free from stretch, that the fat liquor is unnecessary.

It is a well known fact that hides and skins themselves have reducing power, and also attract and separate the oxides of alumina, chromium and iron from their salts. By our process we allow the hides or skins to have an opportunity to complete the reduction of the chromium compound, which is only partially accomplished by the reducing agent in the bath, and we also afford an opportunity for the separation of some oxide of alumina from its salt, and so complete the tanning or tawing process. By saturating the hides or skins with an excess of sulphate of alumina they are in condition to become thoroughly wet again, which is absolutely essential in order that they should be colored and finished. The usual method of procedure at the present time among chrome-tanners is to first saturate the skins with a chromium compound prepared by adding hydrochloric acid to an aqueous solution of bichromate of potash, and then reducing this chromium compound by a bath prepared by adding hydrochloric acid to an aqueous solution of hyposulphite of soda. The skins are removed from this reducing bath, washed, and, without drying out, are subjected to the usual staining, fat-liquoring, coloring and finishing operations. We find that in working this process the reduction of the chromium compound is not complete, and proceeds slowly in the stock after being finished, the result being often disastrous. The oxygen liberated appears to form compounds with the oils and the other materials used in the coloring and finishing processes, causing the stock to shrink and become "spotted," thus seriously impairing its commercial value. We also find that in the reducing bath considerable of the chromium compound is washed out of the stock, and the reduction proceeds in the bath and not in the skins. In this way the skins are not thoroughly tanned, which causes them to crack and become hard after being finished.

Linseed oil is largely used for "oiling off" chrome tanned stock, and we find that after the skins have been finished for some time, a hard varnish frequently appears to form upon the surface of the stock, due to the oxidation of the linseed oil; this oxidation is caused by the liberation of oxygen which takes place when the reduction of the chromium compound proceeds in the finished leather, and the value of the leather is thereby seriously impaired. All these difficulties are avoided by following our process, as the reduction of the chromium compound is continued and the tanning or tawing operation completed by the small amount of oxide of alumina separated from its salt before the stock is subjected to the coloring and finish-

ing processes. Should skins be dried out from the reducing bath without subjecting them to our sulphate of alumina solution, it would be impossible to wet them thoroughly and bring them into a proper condition for coloring and finishing.

It will be understood that alum, which is a double salt, may be used instead of sulphate of alumina, in which case, however, the quantity employed should be about twice as much as the proportion herein given for sulphate of alumina.

Having thus described our invention, we claim and desire to secure by Letters Patent—

1. The within described improvements in the art of tanning or tawing hides or skins, consisting in first subjecting such hides or skins to the action of a solution of a chromic acid compound; second to the action of a reducing bath, and third, to the action of another and different mineral tanning or tawing bath, as and for the purpose set forth.

2. The within described improvement in the art of tanning or tawing hides or skins, said improvement consisting in subjecting the skins first, to the action of a solution of the chromic acid compound, second, to the action of a reducing bath, and third, to the action of a bath containing sulphate of alumina, substantially as specified.

3. The within described improvement in the art of tanning or tawing hides or skins, by the chrome process, said improvement consisting in subjecting the skins first, to the action of a solution of a chromic acid compound, second to the action of a reducing bath, and third to the action of a bath containing sulphate of alumina, and chloride of sodium, substantially as specified.

4. The within described improvement in the art of tanning or tawing hides or skins by the chrome process, said improvement consisting in first, subjecting the skin or hides to the action of a solution of a chromic acid compound, second, to the action of a reducing bath, third to the action of a bath containing sulphate of alumina, and fourth permitting the skins to become dry, and to remain in the dry condition until the chromium compound is reduced, and sufficient oxide of alumina separated from the salt to complete the tanning, substantially as specified.

5. The within described improvement in the art of tanning or tawing hides or skins by the chrome process, said improvement consisting in subjecting the skins first, to the action of a solution of a chromic acid compound, second to the action of a reducing bath, third to the action of a bath containing sulphate of alumina and chloride of sodium, and fourth permitting the skins to become dry and to remain in the dry condition, until the chromium compound is reduced and sufficient oxide of alumina is separated from the salt of alumina, to complete the tanning, substantially as specified.

6. As a new article of manufacture a dry chrome tanned hide or skin saturated with a metallic salt susceptible of removal by washing to render the hide or skin capable of absorbing water in the subsequent treatment, substantially as described.

7. As a new article of manufacture a dry chrome tanned hide or skin uncolored and unfinished, and containing sulphate of alumina capable of removal by washing and serving to permit the thorough wetting of the hide

or skin as a preliminary to the subsequent treatment, substantially as specified.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILLIAM M. NORRIS.
HENRY BURK.

Witnesses:

JOSEPH H. KLEIN,
HENRY HOWSON.