UNITED STATES PATENT OFFICE.

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PROCESS OF TANNING HIDES.

SPECIFICATION forming part of Letters Patent No. 345,827, dated July 20, 1886.

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To all whom it may concern:

Be it known that I, JOHANN SAMUEL BILLWILLER, of St. Gall, in the Republic of Switzerland, have invented certain new and useful Improvements in Processes of Tanning Hides, of which the following is a specification.

This invention relates to an improved process of tanning hides, which consists, first, in treating the prepared hides with a solution of aluminium sulphate; secondly, with a solution of sodium bicarbonate, whereby an insoluble aluminium hydrate is deposited in the fibers, and finally treating the hides with tannic acid. The aluminium hydrate deposited on the surface of the hides is removed by a diluted solution of hydrochloric acid, which is washed out with water, upon which the hides are tanned in the usual manner.

In carrying out my improved process of tanning hides the same are first softened, depilated, and cleaned in the usual manner. They are then subjected for about twenty-four hours to a solution of sulphate of aluminium ($Al_2(SO_4)_3+18H_2O$) and agitated from time to time in said solution. The hides are then removed from the solution and prepared by slightly wringing them for the action of the next solution, which consists of a three-per-cent. solution of bicarbonate of soda, ($NaHCO_3$,) in which the hides remain for from five to fifteen minutes. The solution of aluminium sulphate requires to be of such a degree of concentration that the precipitation of all the aluminium hydrate is produced in the fibers of the hides by the action of the bicarbonate of soda. For the purpose of properly utilizing the solutions employed the hides are passed twice through each solution, said solutions being placed in closed vats, so that the hides are thoroughly penetrated by the solutions. The hides are left for from five to fifteen minutes in the solutions when immersed for the second time. The next step consists in treating the hides with a stronger solution of aluminium sulphate, and then to a five-per-cent. solution of bicarbonate of soda. In each of these stronger solutions the hides are successively immersed three times, each time from five to fifteen minutes. As regards the quantity of the solutions, it is best to take half a gallon of the solution for every six pounds of hides.

The described alternating treatment of the hides with a solution of aluminium sulphate and of bicarbonate of soda may be simplified by exposing the same first for twenty-four hours to a neutralized twenty-per-cent. solution of aluminium sulphate, and then precipitating the aluminium hydrate by an equivalent quantity of a two-to-three-per-cent. solution of bicarbonate of soda. The quantity employed for a twenty-per-cent. solution of aluminium sulphate is one-quarter of a gallon of solution to every five pounds of hides. The treatment with a more concentrated, but as far as possible neutralized, solution of sulphate of aluminium has the advantage that a sufficient quantity of aluminium hydroxide is precipitated by one single treatment with an equivalent quantity of a two-and-one-half-per-cent. solution of bicarbonate of soda for from three to five hours. As the aluminium sulphate and the solution of the same have an acid reaction, even when neutralized as far as possible, it causes the hides to swell, so as to enable them to absorb nearly all the prescribed quantity of the solution that is required for the proper action of the bicarbonate-of-soda solution. During the precipitation of the aluminium hydrate by the bicarbonate of soda a portion of the former is also precipitated on the surface of the hides, which would thereby be liable to assume a sulphur-yellow color by the subsequent treatment with tannic acid. To prevent this the aluminium hydrate is removed from the surface of the hides by passing the wet hides quickly through a one-per-cent. solution of hydrochloric acid, which acid is then quickly removed by washing the hides with water. The so-treated hides are finally tanned with tannic acid or bark solutions by being first treated with a weak one-and-one-half-per cent. brine for producing the so-called "discoloring of the hides," upon which they are subjected from two to three days to the action of a two-per-cent. brine. The hides are next exposed to the action of a three-per-cent. brine, which is sufficient to complete the tanning operation. Thinner hides remain in the last brine from three to four weeks, while heavier hides require from eight to ten weeks, after which they are completely tanned.

The remaining operations—such as the fin-

ishing of the leather, &c.—are accomplished in the usual manner.

It may be stated that bicarbonate of soda, and not monocarbonate of soda, is employed, for the reason that solutions with a strong alkaline reaction affect the skin, and especially the grain side of the same, to a considerable extent, so as to render the leather liable to crack and break easily.

The process described has the essential advantage, as compared to the ordinary process, that the direct deposition of the aluminium hydrate in the fibers of the hides prevents the closing of the fibers and exerts a direct tanning action thereon, while, further, by the considerable affinity of the aluminium hydrate with the tannic acid the reception of the latter is accelerated, and, consequently, the tanning process considerably expedited.

My improved process differs from the well-known tawing processes, inasmuch as in the latter a difficultly soluble basic aluminium salt is deposited by surface attraction, while in my process the direct precipitation in the fibers of an entirely insoluble aluminium sulphate $Al_2(OH)_6$ is produced, by which in the subsequent tanning process the formation of the aluminium tannate is greatly accelerated.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The herein-described process of tanning hides, which consists in subjecting the prepared hides, first, to a solution of aluminium sulphate; secondly, to a solution of bicarbonate of soda, whereby insoluble aluminium hydrate is deposited on the fibers, and, lastly, to the action of tannic acid, substantially as set forth.

2. The process herein described of tanning hides, which consists in the following steps: first, subjecting the properly-prepared hides to the action of a solution of aluminium sulphate; secondly, treating them with a solution of bicarbonate of soda, whereby insoluble aluminium hydrate is deposited on the fibers; thirdly, removing the aluminium hydrate deposited on the surface of the hides by diluted hydrochloric acid; fourthly, removing said hydrochloric-acid solution by washing, and, finally, treating the hides with a tannic-acid solution, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

J. S. BILLWILLER.

Witnesses:
F. SPINLER,
O. FAUST.