

UNITED STATES PATENT OFFICE.

HOMER ELY, OF BALLSTON SPA, NEW YORK.

IMPROVEMENT IN PROCESSES OF PREPARING HIDES AND SKINS FOR TANNING.

Specification forming part of Letters Patent No. **170,623**, dated November 30, 1875; application filed April 23, 1875.

To all whom it may concern:

Be it known that I, HOMER ELY, of Ballston Spa, in the county of Saratoga and State of New York, have invented certain Improvements in the Preparation of Hides and Skins for Tanning; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, which forms part of this specification

My invention relates to preparing hides and skins for the tanning process, wherein the gelatine of hides and skins is acted upon by tannin to convert the hides or skins into leather. It consists in a method of softening and preparing the hides and skins as a preliminary to the action of the tannin liquor, and, though applicable to skins in either the fresh or salted state, it is particularly applicable to hides and skins which have been previously salted.

In carrying out my invention, I place the hides or skins in a vat of clear water, allowing them to remain a sufficient time to soften and remove all the dirt or other foreign substances that may adhere to the surface, and also to soften the hitherto dry and hard hides or skins sufficiently to allow them to be divided down the back into halves, technically called "sides." I allow the hides to remain in this first vat for twenty-four hours, when I find them sufficiently softened to take out and divide as aforesaid. When the dividing is performed, I place the sides in a vat, preferably suspending them by hanging them over bars in a vertical position, twenty sides being a convenient number to operate with in a single vat. For this number of sides I use in the vat a solution of sulphuric acid in water, in the proportion of five pounds of commercial sulphuric acid in about twenty-one hundred gallons of water, which will cover the above-specified number of sides when properly placed in the vat. The action of this solution is to decompose all the salt remaining in the hides or skins. It also softens the gelatine, and opens the pores of the hides or skins, exerting that action upon the same which is technically known as "plumping." The pores of the surface of the skin are opened in this way for the easy and rapid escape of any deleterious matter contained therein.

During the process of plumping, all earthy impurities previously adherent to the hide are thrown out of the pores of the skin, and deposited at the bottom of the vat in the form of a dark-colored sediment, which is easily washed out of the vat by the aid of clear water. The hides are in this way thoroughly soaked, plumped, and cleansed, and, at the same time, such portions of flesh as still remain adhering to the hide are softened, so that they are very easily removed.

In order to complete this second step in the process thoroughly, the hides or skins are subjected to the action of the sulphuric-acid solution for from eighteen to twenty hours. The acid solution is then drawn off from the vat, and the hides or skins are rinsed thoroughly with clear water. I then remove the hides or skins, and place them in another vat containing about fifteen hundred gallons of water. I then dissolve in a sufficient quantity of water to make the solution perfect two pounds of sal-soda and five quarts of soft soap. After these materials are thoroughly dissolved, I add the sal-soda and soap solution to the contents of the last-mentioned vat. The action of the soap upon the hides or skins is to neutralize all the remaining acid in the pores thereof, a certain quantity of the soap being decomposed, and its alkali uniting with the acid to form a soluble salt, which is soaked out in the water of the vat. A certain amount of oleine, margarine, or stearine contained in the soap remains in the texture of the hides or skins, together with a little glycerine. The action of the sal-soda is to keep the hides plump and pliable. When it is omitted from the solution they become shrunken and flat. I always take care to have a slight excess of the soap and sal-soda over and above the amount necessary to neutralize the remaining acid in the hides or skins, and I allow the hides or skins to remain in the vat containing the soap and sal-soda solution for twenty-four hours, at the end of which time they are ready for liming.

In the liming I prefer to adhere to the ordinary course employed by tanners, using nothing but lime. After the hides have passed through the lime, and the hair is removed, I work them out of soft warm water, and then

follow the usual course through the "bating," as it is technically called, and which is a treatment of the hides or skins with hen-manure, or other similar material possessing the property of neutralizing the lime. I allow them to remain in the bate three days, after which they are thoroughly milled, and then, in as rapid succession as possible, they are three times handled in or passed through a solution composed of about twelve hundred gallons of water and three pounds of sulphuric acid, the solution being maintained at a temperature of about 100° Fahrenheit. This treatment neutralizes any traces of lime there may be remaining in the hide, and also removes all the roughness that sometimes shows itself on the hair side of the hides or skins when the bate is not in a proper condition. If the hides or skins have not been sufficiently softened in the bating, all the remaining hardness will be removed by the action of the last-mentioned solution. From this solution the hides or skins are passed into another vat containing about twelve hundred gallons of water to which two pounds of sal-soda and five quarts of soft soap, previously dissolved in soft water, are added. The hides are handled in or passed through this solution twice, and are allowed to remain two hours in the solution after handling. They are now ready for the final working or beaming previous to their treatment with the tanning-liquor. After they have been thoroughly worked or beamed, they are thrown into a vat of water maintained at a temperature of from 90° to 100° Fahrenheit, in which has been previously dissolved saltpeter, in the proportion of one ounce to about thirty gallons of water. In this vat they are allowed to remain for one hour. The action of the saltpeter on the hides or skins is to "plump" or "raise" them, as it is called, facilitating the swelling of the gelatine in the tissue of the skin, and preparing the way for the free admission of the tannin.

The hides or skins are then ready for the action of the bark or tanning solution, in which they are then placed. After I have reached this stage in the process of converting skins into leather, I follow, in every particular, the original process of tanning, by the use of barks containing tannic acid, using nothing but bark in the water of the vat, and discarding everything else of a chemical nature. By this process I am enabled to dispense with the operation known to tanners as "fleshing," and I also save at least one-fourth of the time employed in converting skins into leather by the usual method. I also utilize for glue-manu-

facturing or other purposes a large quantity of fleshy substance, which is usually thrown away. I decrease the expense of time and labor, and facilitate the process of handling, which is performed in a more satisfactory manner.

The advantage obtained by plumping before liming is, that it opens the pores of the surface of the skin, so that the dirt and other deleterious matter which would otherwise obstruct subsequent processes escape freely, and settle to the bottom of the vat.

By this process I also obtain an improved quality in the leather, and the hide acquires a greater degree of softness, pliability, toughness, strength, and weight than by any other process known to me. These qualities are obtained by preparing the hides so thoroughly for the reception of the tannin as to obviate the necessity of using other chemicals with the tannin, and yet to admit of the hides or skins being tanned perfectly in a short space of time.

By supplementing the bating by the action of sulphuric acid, I avoid any weakening or other injury of the leather by putrefactive action in the bate, which sometimes occurs when the bating is too long continued.

Although I have specified the proportions of acid and water in the above-named solution, and the proportions of sal-soda and soap to be used for a given amount of water, I do not strictly confine myself to these proportions, but vary the strength of all the solutions according to the condition of the hides or skins.

What I claim as new, and desire to secure by Letters Patent, is—

1. The treatment of the hides or skins with an acid solution before liming, for the removal of salt or other matters, and for plumping the hide, as herein described and set forth.
2. The treatment with the mixed sal-soda and soft-soap solution after the first use of sulphuric-acid solution, as herein described.
3. The treatment with the mixed sal-soda and soft-soap solution after the second treatment with the sulphuric-acid solution, as herein described.
4. The treatment with saltpeter, as herein described, and for the purpose herein set forth.
5. The process of preparing hides and skins for tanning by treating them with the ingredients named, in the order stated, substantially as and for the purposes herein described.

HOMER ELY.

Witnesses:

MICHAEL RYAN,
FRED. HAYNES.