UNITED STATES PATENT OFFICE.

ERNEST EDWARD MUNRO PAYNE, OF AYLESBURY, AND JOHN PULLMAN AND EDWARD ENGLAND PULLMAN, OF LONDON, ENGLAND; SAID PAYNE ASSIGNOR TO SAID JOHN PULLMAN AND EDWARD ENGLAND PULLMAN.

PROCESS OF LIMING FURS, &c.

SPECIFICATION forming part of Letters Patent No. 631,405, dated August 22, 1899.

Application filed August 26, 1898. Serial No. 689,608. (No specimens.)

To all whom it may concern:

Be it known that we, ERNEST EDWARD MUNRO PAYNE, residing at Aylesbury, in the county of Buckingham, and JOHN PULLMAN and EDWARD ENGLAND PULLMAN, residing at London, in the county of Middlesex, England, subjects of the British Queen, have invented certain new and useful Improvements in Processes of Liming Furs, Hair-Skins, Skins, Hides, Pelts, or Parts Thereof; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The objects of our present invention are, first, thoroughly to lime furs, hair-skins, skins, hides, and pelts; second, to reduce largely the time occupied in the process of liming, it being possible to completely perform the operation of liming hides for tanning in four hours, whereas by the method heretofore employed at least ten days are generally necessary; third, by operating with known weights of hide or skin definite temperature, strength of the solutions used, and time to produce an exact liming result; fourth, to regulate the amount of salts remaining in the limed skin—for example, calcium carbonate, the unregulated presence of which for the purpose of tanning is undesirable—as a hide or skin can be limed by this process and, in the result, be practically free from this salt, while, on the other hand, for certain classes of leather this salt is essential for the production of good leather, and by this process the desired amount can be deposited intimately combined with the fiber, but by the process heretofore used this regulation of the amounts of insoluble calcium salts remaining in the fiber, to almost any degree, is impossible; fifth, to prevent waste, as the quantity of lime used in the ordinary method of liming goods is very considerably in excess of that required by the skins, owing chiefly to the action of the carbonic-acid gas of the atmosphere converting the soluble hydrated oxid of calcium into the carbonate of calcium; sixth, saving in the processes of bating and puring, as the sodium or other salts used in our improved process of liming being soluble the greater portion of them can be readily washed away, and consequently a very much smaller quantity of bate or pure is required, and, seventh, a reduction in cost, since there is little or no waste and the salts are recoverable.

Our invention consists, essentially, in chemically producing calcium hydrate or calcium carbonate in the substance of the skin itself. Instead of treating the skin with these materials externally applied to carry our invention into effect we act upon raw or partially-limed furs, hair-skins, hides, pelts, or parts thereof by means of a weak alkaline solution—caustic soda, (NaHO,) or caustic potash, (KHO,) or the carbonates of such metals, or a mixture of both in any proportion, according to the ultimate degree of liming required—and we then effect the subsequent metathesis of this by a solution of chlorid of calcium, ($CaCl_2$,) or other soluble salts of calcium, so that $Ca(OH)_2$ (calcium hydrate) or $CaCO_3$ (calcium carbonate) is produced and retained and fixed in and in combination with the substance of the skin, the soluble alkaline salts remaining being removed by washing.

The process may obviously be reversed—that is to say, the solution of a calcium salt being used first and the caustic or alkaline solution afterward.

In the case of furs or hair-skins, upon which the lime or caustic alkali in solution possesses a deleterious action, we first submit the furs or hair-skins to the action of a sufficiently strong solution of the calcium salts until they are saturated or imbued with it, and we then paint the caustic or alkaline solution upon the flesh side of the skin, so that by permeation a perfect and intimate liming results without contact with or injury to the fur or hair. These may be dressed in any desired manner. In proceeding according to this modification if calcium chlorid and caustic soda were used the strength of the former would be about two per cent. of calcium chlorid and the latter from three-fourths to one per cent. of caustic soda.

The quantity of lime deposited in the skins by the method described may be accurately determined and regulated by variations in the strength of the solutions employed.

The following description is in illustration of the method which we have found very effective in putting our invention in operation; but it must be understood that we do not confine ourselves exactly to the proportions of the several ingredients, to the exact time occupied in the different proceses, nor to the precise methods of carrying out the operations.

Take fifteen dozen sheepskins, a considerable proportion of the wool of which may have been previously removed in any desired manner, and place them in a revolving drum of about three hundred gallons capacity, making twenty revolutions per minute and containing one hundred and twenty gallons of distilled water at a temperature of about 95° Fahrenheit and holding in solution ten pounds of good commercial caustic soda, sodium hydrate, (NaOH.) Allow these skins to be revolved in the liquor for three hours, after which period they will be swollen or "plumped," but without the appearance or characteristics of limed skins, since they do not contain lime beyond the smaller amount naturally present as a constituent of the raw skin. Draw the skins from the drum and allow them to drain for a few minutes. Then place the skins in the drum, which has beem emptied of its previous contents and in which has been placed fourteen pounds of anhydrous chlorid of calcium in solution in one hundred and twenty gallons of distilled water at a temperature of 95° Fahrenheit. Allow the drum and its contents to revolve for about half an hour. The skins will now present a totally-different appearance and composition identical with the "fully-limed" goods. After completion by copious washing with distilled water the skins upon assay do not yield sodium hydrate, but calcium hydrate intimately combined with skin matter.

Having fully described our invention, what we desire to claim and secure by Letters Patent is—

1. The herein-described process of liming hides, skins and the like, consisting in separately treating such skins with a weak solution of caustic alkali and with a weak solution of calcium chlorid, substantially as described.

2. The herein-described process of treating hides, skins and the like, consisting in separately treating such skins with a weak solution of caustic soda and with a weak solution of calcium chlorid, substantially as and for the purpose set forth.

3. The herein-described process of treating hair-skins and the like, consisting in first treating them with a solution of a soluble calcium salt, and then painting the flesh side of the skins with a solution of caustic alkali, substantially as described.

In testimony whereof we have hereunto affixed our signatures in presence of two witnesses.

ERNEST EDWARD MUNRO PAYNE.
JOHN PULLMAN.
EDWARD ENGLAND PULLMAN.

Witnesses:
EDMUND S. SNEWIN,
WM. H. BROWN.