

UNITED STATES PATENT OFFICE.

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TREATMENT OF HIDES AND SKINS FOR MANUFACTURE INTO LEATHER.

No Drawing.

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To all whom it may concern:

Be it known that we, DOUGLAS McCANDLISH and WILLIAM REARDEN ATKIN, residing, respectively, at Portland Gate House, Portland Gate, Leeds, in the county of York and Kingdom of England, and Ashfield, High Street, Heckmondwike, in the county of York and Kingdom of England, have invented new and useful Improvements in or Relating to the Treatment of Hides and Skins for Manufacture into Leather, of which the following is a specification.

This invention relates to improvements in the treatment of hides, kips, and skins for manufacture into leather.

Hitherto it has been proposed to use solutions of tryptase such as are obtained from animal pancreas for softening, un-hairing and bating raw hides, kips and skins,—all of which are hereinafter termed and included in the term "hides",—for the purpose of removing the hairs and dirt. The action has preferably been assisted by a preliminary treatment with an alkaline solution, and amino-acids have also been added.

The object of this invention is to employ yeast,—after undergoing auto-digestion,—or preparations of such auto-digested yeast instead of pancreas tryptase for treating hides and skins for the softening of dried hides, the removal of hair from all types of hides, and for bating or puering of hides.

The auto-digested yeasts employed are prepared from yeast obtained in the process of brewing, distilling malt, and other materials for the production of beer, spirits and other like fermented or distilled liquors. Preparations of auto-digested yeasts may also be employed.

According to this invention yeast after undergoing auto-digestion and used in or about the hereinafter named proportions has been found to be capable of loosening the hair on hides, and at the same time will remove certain constituents from the hides which are usually eliminated in the bating or puering operations. The hair on fresh hide or hides which has or have been pretreated with acids or alkalis, when sub-

jected to the action of the auto-digested yeast, is loosened in a comparatively short time so that it may be removed by the ordinary methods employed in tannery practice.

In carrying this invention into practice we proceed as follows, namely:—

The softening of dried hides is accelerated by exposing them to the action of auto-digested yeast dissolved or suspended in water. The hides may or may not have received a preliminary soaking, in the usual manner at present in use in tannery practice. The addition of, a reagent capable of swelling hide substance say, formic acid, or an alkali (for example sodium bicarbonate) or certain salts (for example disodium hydrogen phosphate) is made to the water containing the auto-digested yeast, for example:—

Formula No. 1 for softening hides.

One hundred (100) pounds,—avoirdupois,—dried hides are softened by soaking in a suitable vat or container in which is placed a solution of about, two (2) pounds of auto-digested yeast, to which is added, about, say one pound of formic acid, and one hundred (100) gallons of water.

The hides are allowed to steep in this solution about twenty-four to forty-eight hours.

When an alkali is employed in place of an acid then the following formula No. 2,—as an example,—is used, namely:—

One hundred (100) pounds of dried hides,

Two (2) pounds of auto-digested yeast,

One-fourth ($\frac{1}{4}$) pound of sodium bicarbonate, and

One-hundred (100) gallons of water.

Or when a salt is used,—as an example,—the formula No. 3 may be

One hundred (100) pounds of dried hides,

Two (2) pounds of auto-digested yeast,

Four (4) pounds of di-sodium hydrogen phosphate, and

One hundred (100) gallons of water.

For the removal of hair or wool from the hides, either in their normal state, or which have been pretreated with an acid or an

alkali, the swelling that takes place having been subsequently reduced with a suitable neutralizing agent such as, sodium bicarbonate, which is commonly used for this purpose are placed in a vat or container in which there is a mixture of yeast, in its auto-digested form using, say, for each one (1) hundred parts of hides.

Five (5) parts of auto-digested yeast, and

One hundred (100) gallons of water.

Ten (10) pounds of sodium bicarbonate per one hundred (100) gallons of water.

The hides are allowed to remain in the solution until the hair is loosened. After removing the hair or wool, the hide or skin will have the characteristics of a bated or puered pelt.

The bating or puering operation may be carried out when required equally as well upon hides from which the hair or wool has been previously removed by methods ordinarily and commonly employed in the tanning trade.

For example, hides,—that have been ordinarily treated,—after removal of hair by, say, the liming process will require to be washed, and partially neutralized before being exposed to the action of the auto-digested yeast in a paddle wheel or vat of the type generally employed for the purpose, using about three (3) parts of auto-digested yeast to each one hundred (100) parts of pelt.

The just named processes may be carried out with or without the addition of an activator,—such as an ammonium salt,—to stimulate the action of the auto-digested yeast in concentration of about one (1) pound in fifty (50) gallons of water.

The above named weights and quantities may be varied as circumstances require, and consequently are to be treated as examples from which satisfactory results may be obtained.

We are aware that it has been proposed to soak dried or dry-salted hides, kips or skins in a liquor comprising water and negative polyvalent ions produced by one or more salts, containing polyvalent radicles,—such salts being sodium citrate, potassium ferrocyanide, sodium ferrocyanide, and sodium pyrophosphate,—in water, the salt in the concentrations named being capable of dispersing serum albumen which has been coagulated by heat, but are incapable of tanning the pelt; a bating liquor containing one or more enzymes of animal or vegetable origin capable of emulsifying fats or peptonizing albuminoid substances together with one or more antiseptic substances such as, salicylic acid has been used to the exclusion of any other fermentative or biochemical action; hides and skins have been soaked, after the de-hairing process in a so-

lution of sulphur and a carbohydrate in process of fermentation; there has been also introduced into the bath some specific ferment namely yeast to ensure the fermentation of the carbohydrate; hides and skins have been treated prior to tanning with a lipolytic bath of vegetable origin in presence of an agent which promotes lipolytic action, the bath having an acid reaction preferably derived from an organic acid, such as, butyric or lactic acid; the promotive agent may be a lipase-activator or a fat emulsifying agent.

The above methods differ from that described in this specification in that the enzymes liberated by the autolysis or digestion of the yeast, are the active agents in the latter. In this digested form the yeast is incapable of fermenting carbohydrates as described above. Yeasts in their undigested form have also been used for the acid fermentation of carbohydrates, producing such acids as lactic, butyric, and the like, which facilitate the removal of alkali from hides, and also serve to regulate the lipolytic activity of the infusions mentioned above. The use of yeast under any of the last just mentioned conditions is not contemplated. Until the enzymes are liberated from the yeast by auto-digestion or possibly by mechanical or physical means, they are incapable of causing the changes in hides which are herein claimed.

By the phrase "a reagent capable of swelling hide substance" as employed in the foregoing description and following claims is to be understood various substances well known to the trade by such designation and examples of which have been previously pointed out.

What we claim is:—

1. The treatment of hides, kips and skins for the manufacture of leather consisting in subjecting them to the action of a solution of water and an auto-digested yeast.
2. The treatment of hides, kips and skins for the manufacture of leather consisting in subjecting them to the action of a solution of water, an auto-digested yeast and an activator for stimulating the action of the yeast.
3. The treatment of hides, kips and skins for the manufacture of leather consisting in subjecting them to the action of a solution of water, an auto-digested yeast and an ammonium salt.
4. The treatment of hides, kips and skins for the manufacture of leather consisting in subjecting them to the action of a solution of water, an auto-digested yeast and a reagent capable of swelling a hide substance.
5. The treatment of hides, kips and skins for the manufacture of leather consisting in subjecting them to the action of a solution of water, an auto-digested yeast, and an acid reagent capable of swelling a hide substance.

6. The treatment of hides, kips and skins for the manufacture of leather consisting in subjecting them to the action of a solution of water, an auto-digested yeast and formic acid. 5
7. The treatment of hides, kips and skins for the manufacture of leather consisting in subjecting them to the action of a solution of water, an auto-digested yeast, an acid reagent capable of swelling a hide substance, 10 and an ammonium salt.
8. The treatment of hides, kips and skins for the manufacture of leather consisting in subjecting them to the action of a solution of water, an auto-digested yeast, formic acid, and an ammonium salt. 15

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