

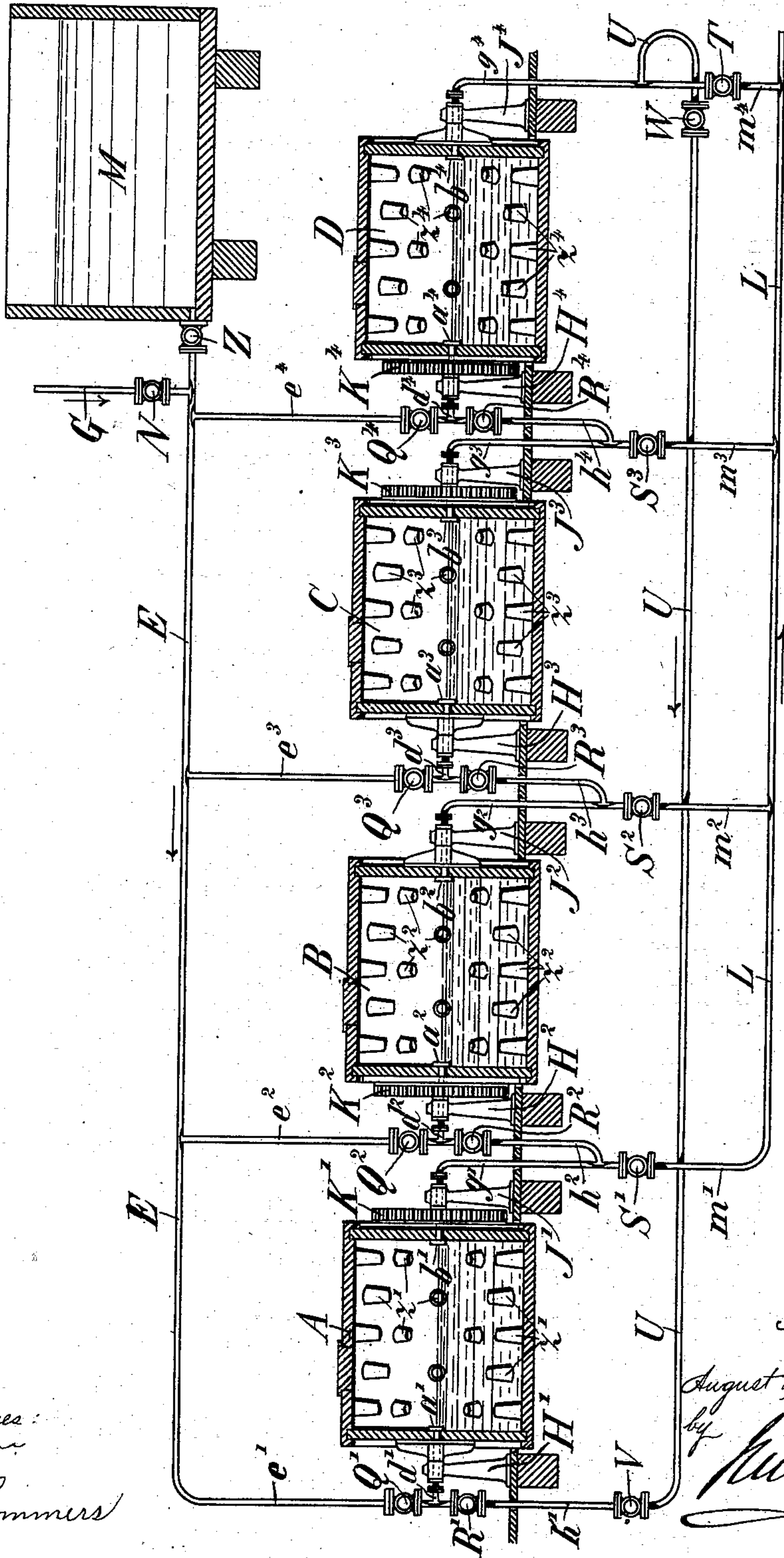
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A. H. SCHMIDT.
PROCESS OF TANNING HIDES.

(Application filed June 15, 1899.)

(No Model.)



Witnesses:
Attest
W. Sommers

Inventor
August Hermann Schmidt
by
Henry M. M.
Attorney

UNITED STATES PATENT OFFICE.

AUGUST HERMANN SCHMIDT, OF HAMBURG, GERMANY.

PROCESS OF TANNING HIDES.

SPECIFICATION forming part of Letters Patent No. 651,935, dated June 19, 1900.

Application filed June 15, 1899. Serial No. 720,637. (No specimens.)

To all whom it may concern:

Be it known that I, AUGUST HERMANN SCHMIDT, a citizen of the free and Hanseatic town of Hamburg, in the German Empire, have invented a certain new and useful Process of Tanning Hides, of which the following is a specification.

My invention relates to a process for tanning hides whereby the tanning solution, in conjunction with oxygen or air, is caused to act upon the bated and depilated hides, thereby effecting a more rapid process and better leather.

I have found that tannins in the presence of oxygen split up and form products whose exact chemical composition is not known, but which have a most beneficial and rapid tanning action on the hides, especially in the early stages of the process, when they penetrate the hides with the greatest ease.

The hides or skins are raised or swelled previous to my tanning process, which can be done in accordance with any of the methods usually employed, as by means of water acidulated with sulfuric acid or similar solutions. This swelling or raising loosens all the fibers of the corium and allows the products due to the action of the oxygen on the tan liquor to penetrate into the hide or skin. If this swelling or raising were not done, the aforesaid tannin products would not penetrate the hide or skin, but form a crust on or in the outer fibers and prevent any further penetration or absorption. As the tan liquor or ooze is in contact with the hides during the tanning process and has an astringent or shrinking action on the fibers, it is best, in order to effect a thorough penetration of the products of decomposition, to treat the depilated and bated hides first with a weak solution of tan liquor in conjunction with a gas rich in oxygen, as air enriched in oxygen or ozone, so as to cause at this stage the most active formation of decomposition products of the tanning before the fibers of the hide or skin have shrunk or contracted too much, which would be the case if a strong solution of tannin were used at this time, thereby preventing the formation of an impermeable deposit or crust on the surface of the hides.

By "air rich in oxygen or ozone" I mean

air containing from two to three times the normal proportion of oxygen or ozone.

Inasmuch as the astringent action of the tanning liquor upon the hides depends upon the degree of concentration of such liquor and in order to avoid too great a contraction of the hides in the start and at the same time promote the formation of the split products referred to and enable them to more readily penetrate into the raised or swelled green hides, I use in the start a weak tanning solution and a gas or air rich in oxygen or ozone, as above set forth.

The green hides are kept in motion in a confined space in a revoluble drum half-filled with tan liquor and hides, the other half of the drum being filled with air rich in oxygen or ozone. The great amount of oxygen or ozone acting upon the constantly-agitated tan liquor in contact with the hides oxidizes the former, split products in large quantities being formed, which readily penetrate the hides. After the hides have been exposed to the action of these split products, say, for from about four to six hours, according to texture and weight, the tan liquor is removed, and fresh and more concentrated liquor is introduced into the drum in such a manner as not to allow the air therein to escape. Inasmuch as the air has given up about one-half of its oxygen in the first stage, the oxidizing action of the air on the tan liquor is correspondingly reduced, while the action of the stronger tan liquor on the hides is correspondingly increased, resulting in a further contraction or shrinking of the hides or skins, with a reduction in the proportion of split products. After the hides have been exposed to the action of the stronger liquor and to the action of the split products formed for a sufficient length of time—say for about eight hours—the tan liquor is again removed and a stronger liquor supplied to the drum. During the second stage the air will have been deprived of about two-thirds of its oxygen or ozone, so that the formation of split products during the third stage is still further reduced, while the action of the still stronger tanning solution on the hides or skins is correspondingly increased, the operation of tanning being completed during this

third stage after the hides or skins have been exposed to the action of the tan liquor and split products for a suitable length of time—say for about ten hours—when it will be found that the air has been deprived of substantially the whole of its oxygen or ozone. It will thus be seen that the action of the tanning agent upon the hides is successively increased, while the formation of split products is successively reduced.

The strength of the tanning liquor at each of the above-described stages of my process will naturally vary in accordance with the texture and weight of the hides or skins to be tanned. Thus, for instance, in tanning hides or skins of finer texture and of moderate weight the tanning liquor used in the first stage may have a strength of 1° Baumé, more concentrated liquor being used for the second and third stages, as liquors of from 2° to 4° Baumé, while about sixty gallons of air rich in oxygen or ozone to every square foot of hide or skin is required.

In view of the peculiar mode of carrying out my invention the process is readily applicable to a continuous operation, as will hereinafter appear.

In order that the nature of the invention may be more fully understood, I will now describe the same in detail, reference being had to the accompanying drawing, which illustrates in section the preferred form of apparatus suitable for the purpose.

Similar letters of reference refer to like parts.

The apparatus consists of a series of vessels—say four drums A B C D—to each of which is secured a gear-wheel $K^1 K^2 K^3 K^4$, respectively adapted to be driven by pinions on a belt-driven line-shaft or other convenient means. (Not shown.) The drums receive a slow rotary motion and are supplied from a suitable tank M by means of a main feed-pipe E, having branch pipes $e^1 e^2 e^3 e^4$, inlet connections $d^1 d^2 d^3 d^4$, and central nozzles $a^1 a^2 a^3 a^4$, while the tanks discharge through similar nozzles $b^1 b^2 b^3 b^4$ and outlet connections $g^1 g^2 g^3 g^4$ into a common outlet-pipe L. By this means the drums can be only half-filled with tan liquor, while the remaining space is filled with air having a greater or less percentage of oxygen, according to the weight and size of the skins or hides. The wooden walls of the cylindrical drums are furnished with pegs $z^1 z^2 z^3 z^4$, respectively, which during the rotation of the drums repeatedly lift the soaked skins out of the liquor and expose them to the action of the oxygen of the air contained in the drums and finally allow them to drop back into the tan liquor. One of the four drums shown is supposed to be discharging and recharging while the others are in operation, and we will consider that the drum A is stationary for this purpose and that the drums B C D are in operation. The drums are rotatably mounted in suitable standards $H^1 J^1 H^2 J^2 H^3$

$J^3 H^4 J^4$. Of these three drums the drum B is the most advanced, the drum C the next, and the drum D is the one last charged. The introduction of concentrated liquor is effected by closing the inlet-valves $Q^1 Q^3 Q^4$ N and opening the valve Q^2 of the drum B and also the valve Z of the tank M. The liquor from the tank then flows through the main pipe E, branch pipe e^2 , valve Q^2 , connecting-pipe d^2 , and hollow pivot a^2 into the drum B, where we have a strong solution of tan liquor flowing into said drum, which in the last stage of the process is exhausted of the greater part of the oxygen therein, thus allowing mostly tannin itself rather than its decomposition products to act on the hides contained therein. From this drum the weakened liquor, say, of mean concentration runs off through the outlet-nozzle b^2 , connecting-pipes $g^2 h^3$, valve R^3 , pipe d^3 , and nozzle a^3 into drum C in a continuous stream, where we have a liquor of mean concentration, an atmosphere, say, of mean concentration in oxygen, and hides in the middle stage or second period of the tanning process and where the atmosphere is being depleted of its oxygen and the tan liquor of its tannin. The liquor leaves the tank C through pivot b^3 , connections $g^3 g^4$, and valve R^4 , pipe d^4 , inlet-nozzle a^4 , and enters the drum D a weak liquor, where it comes in contact with hides just raised or swollen and an atmosphere rich in oxygen. The liquor leaves this tank by nozzle b^4 , pipe g^4 , valve T, and pipe m^4 into the exhaust-pipe L and may then be used for other purposes, but is too poor in tannin for further use in this process.

When the skins in the drum B are tanned, it is stopped for discharging, while the drum A, which has just been charged, is put into service and the strong liquor from tank M is caused to pass through the main pipe E, branch pipe e^3 , valve Q^3 , connecting-pipe d^3 , and hollow pivot a^3 into the drum C, from which it flows, mediumly concentrated, as above described, into drum D and thence through nozzle b^4 , pipe g^4 , return-pipe U through the open valves W and V therein, pipe h^1 , valve R^1 , pipe d^1 , and nozzle a^1 into drum A a weak liquor, and after exhaustion it is discharged through the nozzle b^1 , pipe g^1 , valve S, and pipe m^1 into the discharge-pipe L.

When it is desired to discharge the liquor from any one drum, compressed air from an air-pipe G is allowed to enter the main pipe E by opening the valve N, and thus permit the air to pass to such drum and force out the liquor.

My improved process enables me to produce a leather tougher and of a better quality than that produced by the quick processes now in use and even better than that produced by the lengthy pit-tanning.

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

1. In the art of tanning, the process which consists in subjecting bated and depilated skins to the action of a tan liquor of increasing strength and to an atmosphere decreasing in its content of oxygen, substantially as described.

2. In the art of tanning, the process which consists in subjecting bated and depilated skins to the action of a weak tan liquor and an atmosphere strong in oxygen, concentrating the liquor during the tanning and decreasing the amount of oxygen, substantially as set forth.

3. In the art of tanning, the process which consists in subjecting the skins to the action of a weak tan liquor and to the action of an atmosphere rich in oxygen, then subjecting said skins successively to the action of tan liq-

uors of correspondingly-increasing strength and to the action of an atmosphere correspondingly poorer in oxygen, said skins being exposed to the action of the tan liquor and to that of the oxygen alternately during said operation, substantially as set forth.

4. In the art of tanning, the process which consists in subjecting bated and depilated hides to the simultaneous action of a tanning liquor of gradually-increasing strength and an atmosphere containing oxygen, the proportion of oxygen in the atmosphere diminished as the strength of the tan liquor increases, substantially as set forth.

AUGUST HERMANN SCHMIDT.

Witnesses:

ALEXANDER SPECHT,

ERNEST H. L. MUMMENHOFF.