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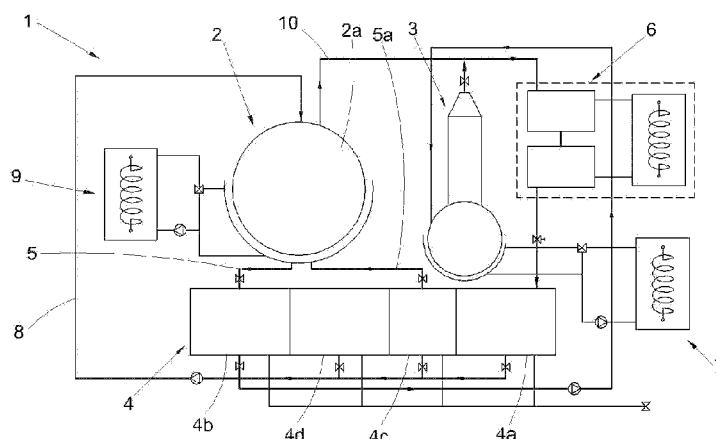
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(54) Title: PROCEDURE FOR THE TANNING OF SKINS, MATERIAL OBTAINED DURING SAID PROCEDURE AND DEVICE



Figure

(57) Abstract: The procedure comprises subjecting the skins to riverside works and, A) sammying the skins; dehydration and degreasing in a water miscible solvent; drying of said solvent; or B) sammying the skins; dehydration and degreasing in a water miscible solvent that comprises aliphatic hydrocarbons; drying of said solvent; or C) pickling; laying out; degreasing; acidification; sammying the skins; drying; or D) pickling; laying down; degreasing; acidification; pre-tanning with pre-tanning products; sammying of the skins; and drying; wherein said drying allows dry and frayed skins to be obtained and, next, a tanning stage by immersion in a solution of mineral salts, vegetable tannin extracts or mixtures thereof. This invention also provides a material obtained before the tanning, useful as a replacement for the skin tanned by conventional methods, as well as a device for dehydrating and degreasing the skins following option A) of the claimed procedure.

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PROCEDURE FOR THE TANNING OF SKINS, MATERIAL OBTAINED
DURING SAID PROCEDURE AND DEVICE

5

FIELD OF THE INVENTION

This invention relates to a procedure for the tanning of skins. In particular, this invention provides, in a first aspect, a fast tanning procedure of less energy consumption that can be carried out in a continuous process irrespective of the volume of hides to be treated.

Thus, this invention provides a useful procedure for the treatment of any type of skin, for example, cow hides, sheep or lamb skins, goat, pig, reptile, or exotic skins, fast and with a good tanning quality.

This invention also relates to the material obtained during said procedure before the tanning stage takes place, a material that is useful as a substitute for skins tanned using conventional methods. The invention also relates to the use of shavings of said material for the manufacture of glues and gelatins, artificial guts (sausage casings), cosmetics and drugs.

In another aspect, the invention provides a device for carrying out the dehydration and degreasing of the hides in a water miscible solvent medium.

DESCRIPTION OF THE BACKGROUND OF THE INVENTION

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The transformation of hides into leather is a treatment that has been known for many years which involves riverside works, tanning works, post-tanning and finishing works.

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The usual riverside works comprise the stages

of soaking the skins, fleshing, daubing, unhairing (depilation), liming, and deliming-bating.

Usually, the tanning tasks involved a pickling stage, followed by laying down of the skins, degreasing 5 them, acidification and tanning with mineral salts or vegetable extracts. The penetration times of the salts or vegetable extracts in the skins inside the classical drums used for this treatment may range between 6-72 hours or even more. These drums turn the skin to be 10 treated, the salts or vegetable extracts and the solvent medium contained therein for a long period of time with a view to the tanning agent soaking through the entire thickness of the wet skin.

Once the skin has been tanned, the contraction 15 temperature is determined to see whether this stage was carried out successfully. Next, if wanted, the wet skin is machined, in other words, is subjected to the stages of shaving and stretching, followed by re-tanning operations, dyeing and greasing before the final drying 20 operation and subsequent finish. In general, these operations are referred to as post-tanning and finishing works.

DESCRIPTION OF THE INVENTION

25

This invention provides, in a first aspect, a procedure for the tanning of skins that involves subjecting said hides to riverside works, wherein said riverside works substantially comprise the stages of:

30 soaking the skins;

ii) fleshing;

iii) daubing;

iv) unhairing(depilation);

v) liming and

35 vi) deliming-bating,

and is characterized by the fact that next the following stages are carried out:

A) - sammying of the skins; - dehydration and degreasing of the skins in a water miscible solvent medium that
5 comprises an alcohol C_1-C_7 , or a ketone C_3-C_7 ; - drying of said solvent, for example in a vacuum; or

B) - sammying of the skins; - dehydration and degreasing of the skins in a water miscible solvent medium that
10 comprises aliphatic hydrocarbons; - drying of said solvent, for example in a vacuum; or

C) - pickling; - laying down; - degreasing; - acidification; - sammying of the skins; - drying; or

D) - pickling; - laying down; - degreasing; - acidification; - pre-tanning with pre-tanning products
15 such as, for example, a 1-10% solution of aldehydes or synthetic tannins; - sammying of the skins; - drying;

Wherein said drying allows dry and frayed skins to be obtained and, next, is carried out

- a stage of tanning by immersion in a solution of
20 mineral salts, tannin vegetable extracts or a mixture thereof. Preferably, said tanning in a solution of tannin vegetable extracts is carried out at a temperature ranging between 0 and 45°C, and said tanning in a solution of mineral salts at a temperature ranging between 0 and
25 60°C.

Advantageously, the drying in any of lines A), B), C) or D) allows the skins to dry and come out frayed and with a soft and flexible appearance that allows next and before the stage of tanning by immersion, optionally,
30 the stage of shaving to be carried out without problems of burning the skin.

Usually, the stage of shaving is carried out after tanning the skin due to the fact that the tanned skin has a higher contraction temperature and this
35 prevents the alteration of the skin's properties due to

the heat transferred during shaving (fast cutting) thereof. Also, in the state of the art, the consistency of an untanned skin whether in wet state or dry state is not suitable for carrying out this mechanical stage of 5 shaving prior to tanning.

Surprisingly, the authors of this invention provide a procedure that allows the skins to come out in a dry and frayed state and with a consistency and contraction temperature when dry that allow, if wanted, 10 this stage of shaving to be carried out without problems of burning the skin before carrying out said tanning stage. This entails a substantial saving in both the quantity of the solution to be used during the tanning phase and in the material to be tanned. In particular, 15 this stage of shaving provides, on the one hand, a material in suitable conditions for undergoing tanning and, on the other hand, generates a residue of shavings of the dry and frayed material. These shavings have a special application in the manufacture of glues and 20 gelatins, artificial guts (sausage casings), cosmetics, drugs, etc, therefore giving an end use to a residue of the shaving stage. The material in dry and frayed state obtained at this point of the procedure has been given the name dehydrated collagen biomaterial. This material 25 is useful in fields of the technique unrelated to the invention, not contemplated to date by an expert in the art.

Thus, in the case of A) wherein a stage of sammying the skins is carried out; dehydration and 30 degreasing in a water miscible solvent medium; and drying of said solvent in a vacuum, the skin is obtained in a dry and frayed state with the suitable consistency for carrying out, optionally, a stage of shaving before tanning said skins by immersion. During the drying, for 35 example, in a vacuum, the bonding of amino groups and

carboxyl groups of the side chains of the collagen protein is prevented, in these conditions not forming electrostatic bonds that would give rise to a hard and compact skin. Advantageously, the stage of dehydration and degreasing is carried out in a water-miscible solvent selected from among an alcohol C_1-C_7 , or a ketone C_3-C_7 , preferably it is selected from among acetone, isopropyl alcohol and methanol.

At the same time, in the case of B) wherein the skins are sammied; dehydrated and degreased in a water miscible solvent medium that comprises aliphatic hydrocarbons; and dried of said solvent in a vacuum, the skin is also obtained in a dry and frayed state with the suitable consistency for carrying out, optionally, a stage of shaving before tanning said skins by immersion. The shavings obtained in said stage of shaving have applications in the various fields of the technique described above. The use of a water miscible solvent allows the formation of a monomolecular layer of coating on the fibres which followed by drying, for example, in air or in a vacuum avoids the joining of the fibres to each other and, therefore, allows a dry and frayed skin to be obtained with a soft and flexible appearance. Advantageously, said aliphatic hydrocarbons are selected from among those aliphatic hydrocarbons having a boiling point in the range between 180°C and 240°C.

The procedure of the invention entails a significant overall energy saving compared to the procedures that use drums in the tanning phase, in addition to not generating residual baths since the solvent used during dehydration and degreasing can be easily recovered. The subsequent elimination of the solvent that soaks the skin leads to achieving a skin with the appearance of dry and frayed leather: white opaque skin, flexible and spongy; with a great absorbing

power.

Obtaining dry and frayed skins makes it possible to carry out the stage of tanning by immersion with a solution of mineral extracts, vegetable tannin 5 extracts, retanning agents, dyes and greases or a mixture thereof with a substantial reduction in time and energy.

Thus, whereas to date to carry out the tanning stage of wet skins inside a drum required a time of 6-72 hours, with the procedure of the invention only a few 10 minutes are required in order to obtain a good tanning of the skins on top of not requiring the mechanical movement needed by tanning that uses a drum.

Also this invention, in case C) wherein pickling, laying down; degreasing; acidification; 15 sammying of the skins; and drying is carried out; and in case D) wherein pickling; laying down; degreasing; acidification; pre-tanning with pre-tanning products such as, for example a 1-10% solution of aldehydes or synthetic tannins; sammying of the skins; and drying is 20 carried out; dry and frayed skins are obtained with the suitable consistency for carrying out, optionally a shaving before carrying out the tanning stage by immersion in a solution of mineral salts, vegetable tannin extracts or mixtures thereof. The shavings of the 25 dehydrated collagen biomaterial obtained in this shaving stage have an application in the different fields of the technique described above.

The dry and frayed skin behaves as if it were a sponge, meaning that during the tanning stage, the skins 30 absorb the solution that comprises the mineral salts, vegetable tannin extracts or mixtures thereof with the speed of a sponge.

In this invention "vegetable tannin extract" is understood to mean at least one vegetable extract or 35 mixture of vegetable extracts, re-tanning agents, dyes

and greases. These vegetable extracts may be selected, for example, from among quebracho extract, chestnut extract, extract of mimosa, extract of valonea, extract of tara or grapeseed extract.

5 Advantageously, the tanning solution that contains mineral salts selected from Cr, Al or Zr, vegetable tannin extracts or mixtures thereof may additionally comprise one or more greasing agents, dyes, and retanning agents that confer even more flexibility on
10 the skin.

 It is noteworthy that with the procedure of the invention it is not necessary to carry out a mechanical movement such as the one carried out by the drums during the tanning stage meaning that a considerable energy
15 saving is achieved.

 Also advantageously, the procedure of the invention can be carried out in a continuous process since the volume of skins to be treated is not conditioned by the volume of the drum. Thus, the
20 procedure of the invention can be carried out for small volumes of skins to be treated and for high volumes since it is not conditioned by mechanical elements (drums) with pre-established sizes.

 The advantages of the procedure of the invention entail a significant energy saving also due to
25 the fact that residual baths are not generated in cases A) and B), especially because the solvent employed can be recovered.

 Below we include the results of physical and
30 chemical tests on sheepskin and cow hides which have been subjected according to the invention to the stages defined in A), B), C) or D), before carrying out the tanning by immersion.

 Table 1 below shows the results of the physical
35 tests and Table 2, the results obtained in the chemical

tests.

From these tests we can observe a substantial increase in the contraction temperature of the skin obtained in a dry and frayed state, which ensures that 5 problems resulting from burning the skin would be avoided if the stage of shaving were carried out before carrying out the tanning by immersion. It is also noteworthy that the apparent density values obtained in said tests confirm that the skin has been frayed and has a soft and 10 flexible appearance.

This invention also provides the skin with physical characteristics not obtained to date.

In accordance with the invention, a material based on cow hide, sheep or lambskin, goat, pig, reptile, 15 or exotic skin is provided, obtained after carrying out any of the stages defined in A), B), C) or D), and that without the tanning stage presents a dry contraction temperature higher than 60°C, advantageously higher than 80°C and even more advantageously higher than 100°C. This 20 material is characterized in that it comprises a concentration of collagen fibres as high as 80% or more and in that it does not contain additional chemical agents, and is therefore totally biodegradable.

Advantageously, the dry material obtained 25 according to any of the stages defined in A), B), C) or D), without carrying out the tanning stage presents physical properties even better than those of a skin that has been subjected to the tanning stage. Thus, the material obtained following any of the stages defined in 30 A), B), C) or D) presents a dry contraction temperature higher than 60°C. The dry contraction temperature values were obtained taking into account a wetness of the material in the region of 12%.

It is also noteworthy that the material 35 obtained according to any of the stages defined in A),

B), C) or D), presents apparent density properties that are considerably superior to those obtained from a skin that has been subjected to the tanning stage.

Advantageously, said material may be subjected to a stage of waterproofing or water-repelling with fluorocarbons, silicones or other water repellents or water proofing agents in solution in order to obtain an end product with even better characteristics than those of a skin that has been subjected to the stage of tanning with mineral salts or with vegetable extracts. Therefore, the invention also provides an end product that replaces current skins tanned, for example, with chrome or vegetable, with the enormous advantages that this implies from an environmental perspective.

TABLE 1: Physical tests on the dehydrated collagen biomaterial, in other words the material obtained not yet subjected to tanning.

Concept	Norm	Units	Sheepskin	Cow hide
Thickness	IUP-4/ ENISO2599	mm	1.18	2.50
Apparent density	IUP-5/ ENISO 2420	g/cm ³	0.48	0.49
Tensile strength	IUP-6/ ENISO 3376			
Strength		N	171.5	580.0
Traction		N/mm ²	14.4	23.4
Elongation at break		%	66.0	60.2
Tear resistance	IUP-8/ ENISO 3377-2	N/mm	44.8	57.6
Contraction temperature Wet	IUP-16/ ENISO 3380	°C	62.1	60.0
Dry		°C	109.3	103.3

TABLE 2: Chemical tests on the dehydrated collagen material, in other words, the material obtained not yet subjected to the tanning stage.

Concept	Norm	Units	Sheepskin	Cow hide
Dichloromethane-extractable substances	IUC-4/ ENISO 4048	%	0.7	0.3
Volatile materials	IUC-5/ ENISO 4684	%	12.4	12.3
Protein (collagen)	IUC-10/ ISO 5397:1994	%	86.9	87.4

5

This dry and frayed material contains mainly collagen fibres and is characterized in that it doesn't contain additional chemical products, being totally biodegradable. If wanted, this material can be waterproofed, dyed and finished replacing current leathers tanned with mineral salts such as, for example, chrome, and vegetable.

According to a second aspect of the invention a device is provided to dehydrate and degrease skins in a water miscible solvent medium according to option A) of the claimed procedure which is characterized in that it comprises:

- a machine for washing said skins using a water miscible solvent medium, allowing said machine to carry out a wash cycle that includes a number of consecutive stages of washing said skins with different fractions of said solvent medium each one of said washing stages including the sammying by centrifugation of said skins,
- a distillation column to evaporate the solvent leaving as residue the water and the grease separated from said

skins,

- a tank equipped with a compartment for recovering, once condensed, the solvent medium coming from said distillation column, said tank being fitted with means to supply said washing machine with the recovered solvent, in such a way that said recovered solvent may be used in a new wash cycle.

Thanks to the described characteristics, the new stage of dehydration and degreasing of the skins that is referred to in option A) of the claimed process, can be carried out in a very easy and simple manner, by means of a device that recovers the solvent medium employed so that it may be used in another wash cycle. In this way, the financial cost of this new stage is much lower.

Preferably, the tank of the device includes a second compartment for storing the effluent from the last wash stage of each cycle and means to supply the effluent from this compartment to said washing machine, when a new wash cycle begins.

Thanks to this, the device allows the cleaner effluent of the last wash of each cycle to be recovered and taken advantage of to carry out the first wash of a new cycle. In this way, the amount of effluent that the distillation column has to treat is reduced.

Also preferably, the device comprises means for drying the skins sammied at the end of said wash cycle, and means for condensing the solvent medium evaporated on the way out of drying, said condensed solvent being driven to said tank so that it can be used in a new wash cycle.

Thanks to this, the same device allows the completion of the treatment of the skins according to option A), recovering moreover the evaporated solvent medium so that it can be used in another wash cycle.

DESCRIPTION OF THE DRAWING

For improved understanding of what is described herein a drawing is included which, as an illustration 5 and only by way of an example without limitation, represents a practical case of embodiment of a device for dehydrating and degreasing skins using a water miscible solvent medium, according to option A) of the claimed procedure.

10

DETAILED DESCRIPTION OF THE DEVICE

In accordance with figure 1, the device 1 for dehydrating and degreasing the skins of this invention 15 includes;

- a machine 2 for washing the skins inside a drum 2a with a water miscible solvent medium, preferably acetone,
- a distillation column 3 to separate the solvent medium from the grease and the water on the way out of the wash, 20 and
- a tank 4 with a compartment 4a to recover, once condensed, the solvent medium separated in distillation column 3.

The machine 2 is programmed to carry out wash 25 cycles that include at least four consecutive wash stages of the same skins with different fractions of solvent.

Each wash stage ends with the sammying of the skins by centrifugation. Said sammying generates an effluent that contains the solvent, grease and water, 30 which is directed through pipe 5 to compartment 4b of the tank 4 in order to be treated in distillation column 3 and condensation unit 6.

Distillation column 3 separates, by means of heat provided by a heating unit 7, the pure solvent 35 medium from the grease and the water contained in the

washing effluent. Once separated and condensed, the solvent medium will be recovered in compartment 4a of tank 4 in order to be reutilised in a new wash cycle, through a pipe 8 connected to drum 2a of the machine 2.

5 The water content of the skins that enter the treatment cycle is approximately 70% by weight. Nonetheless, in each wash stage the content of water and grease gradually decreases until it reaches values of below 5% by weight of water and a grease content of less
10 than 1% in the last wash stage.

Tank 4 has been fitted with a compartment 4c to collect separately, through pipe 5a, the effluent rinsed in said last wash stage and to lead it to the machine 2 for use in the first stage of another wash cycle. In this
15 way, the cleaner effluent of the last wash stage of each cycle can be reused, meaning that the amount of effluent that distillation column 3 must treat is reduced.

In the described embodiment, the machine 2 includes a ventilator (not shown) to dry the skins once
20 they are washed and sammied, and a heating unit 9 to provide heat for the drying air inside the drum 2a of the machine 2.

Thanks to the presence of the abovementioned ventilator and heating unit 9, the solvent medium that is
25 still present in the degreased skins is evaporated, meaning that it can also be recovered through a conduit 10 to compartment 4a of tank 4 also for reuse, once condensed.

Alternatively, the drying can be carried out by
30 means of a pump that creates a vacuum inside drum 2a, it being likewise possible to recover the evaporated solvent, once condensed.

EXAMPLES OF THE PROCEDURE

Next, we include preferred embodiments of the procedure according to the first aspect of this invention, wherein an expert in the art can carry out variations relating to either the treatment conditions or the compounds used that may be replaced by other equivalent ones without thereby escaping the scope and essence of the claimed invention.

10 **Example 1: Tanning with vegetable tannin extracts: Mixture of extracts of Quebracho, Mimosa, Valonea, Tara and Chestnut.**

According to another embodiment of the fast tanning procedure following the invention, the concentration of the solutions in which the dry and frayed leather or skin is submerged can vary very much. In this embodiment, the tanning solution presents a concentration that ranges between 10 and 30% of vegetable tanning extract (quebracho, mimosa, valonea, tara, chestnut). The tanning temperature may also vary in the range of 0 or 5 to 45°C, preferably for improved penetration of the vegetable extract solution in the skin a tanning temperature in the range between 20 and 25°C. Once tanning has finished, it is advisable, if it has been carried out in cold, to increase the temperature of the bath up to values ranging between 35 and 39°C in order to improve the fixation of the vegetable tannin extracts to the collagen of the skin.

When tanning has ended, the skin must be machined (shaved) and, then the finishing operations must be carried out such as dyeing and greasing of the skin. Dyeing and greasing may be carried out in a drum in the usual way and, subsequently, the leather/skin must be sammied and subjected to the final drying operation wherein the unfixed tannins must be prevented from rising

to the surface, darkening the colour of the skin and making the grain tender. Finally, the final finishing products are applied to the skin once it has dried.

Various tanning tests were carried out using 5 systems for the immersion of dry and frayed skin samples in tannin solutions of varying concentrations and with different solvent media in the tanning solution.

Example 2: Tanning with vegetable tannin extracts: Mimosa
10 **extract (ME ATO) in an aqueous solution.**

Baths are prepared at 10-25% of extract, wherein the pH is around 5.0, the samples of dehydrated skin are submerged (dry-white) for brief moments and once 15 sammied, it was observed that the skin was totally tanned-through. The contraction temperatures determined through differential sweep calorimetry (DSC) ranged between 70.0-79.0°C, which ensured a good tanning of the skin.

These samples of leather or skin were dried in 20 suitable conditions of high relative humidity and room temperatures, finally obtaining the light beige colour typical of leathers tanned with Mimosa.

Example 3: Tanning with vegetable tannin extracts:
25 **Extract of Mimosa (ME ATO) in a water-solvent solution.**

Solutions for tanning by immersion based on a water-solvent mixture

An aqueous solution containing 60% methanol is prepared, which is used to dissolve the vegetable extract 30 of Mimosa (ME ATO). Baths are prepared at 10-35% of extract, wherein the pH is around 5.4, the samples of dehydrated skin (dry-white) are submerged for brief moments and once sammied, it was observed that the skin was totally tanned through. The contraction temperatures 35 determined by differential sweep calorimetry (DSC) were

between 69.1–79.0°C, which ensured a good tanning of the leather or skin.

In a finishing operation, these leather samples were dried in suitable high relative humidity and room temperature conditions, obtaining finally the light beige colour typical of leathers tanned with Mimosa.

Example 4: Tanning with basic chrome salts.

Riverside works

10 **Preparation of the skin:** Dehydration, degreasing and drying;

Chrome treatment: Treatment with a solution of 10% chrome salt with 45° Sch basicity. The test was repeated with different solutions of different concentrations from 5 to 15 25% chrome salt with basicity from 25 to 52° Sch of basicity.

A raw salted lambskin from the country, with a pelt weight of 1.5 Kg, was subjected to the classical riverside works up to the operation of deliming-bating.

20 Next, the skin was sammied to a humidity of 60%, and dehydration-degreasing was carried out by means of the application of 3 consecutive washes of acetone with 100% over sammied pelt weight during 1 hour each. The first wash took most of the water and the 2nd and 3rd wash 25 served to finish dehydrating the skin. The acetone, diluted with water, has to be recovered.

The solvent that soaks the skin is evaporated leaving a skin with the appearance of dry and frayed leather: an opaque white skin, flexible and spongy; which 30 has a great absorbent power. The vaporised acetone is recovered by making the drying air pass through a cooling apparatus.

The dry and frayed skin is introduced during 1 minute in a solution at 10% of basic chrome salt of 35 45°Sch. The skin is sammied manually or using automatic

systems up to a final humidity of 50% over the end weight. As the skins pass through, the solution with the selected concentration of chrome salt is absorbed, meaning that it needs to be replaced in the wash. In a few hours the skin acquired a contraction temperature higher than 100°C, for example 104°C for a solution of 10% basic chrome salt of 45°Sch, which indicates that an important stabilisation of the skin's collagen has taken place, leaving it with an appearance similar to commercial wet-blue (tanning with wet chrome) in terms of colour and overall appearance. The pH of the chrome salt solution used in this example was 3.3 for a basicity of 45°Sch. The pH of the skin in wet blue (tanning with wet chrome) for the specific test of a solution at 10% of basic chrome salt of 45°Sch was 4.5.

C L A I M S

1. Procedure for the tanning of skins that
5 comprises subjecting said skins to riverside works,
wherein said riverside works substantially comprise the
stages of:
soaking the skins;
ii) fleshing;
10 iii) daubing;
iv) unhairing (depilation);
v) liming and
vi) deliming-bating,
characterized in that next the following stages are
15 carried out:
A) - sammying of the skins; - dehydration and degreasing
of the skins in a water miscible solvent medium that
comprises an alcohol C₁-C₇, or a ketone C₃-C₇; - draying of
said solvent; or
20 B) - sammying of the skins; - dehydration and degreasing
of the skins in a water miscible solvent medium that
comprises aliphatic hydrocarbons; - drying of said
solvent; or
C) - pickling; - laying out; - degreasing; -
25 acidification; - sammying of the skins; - drying; or
D) - pickling; - laying out; - degreasing; -
acidification; - pre-tanning with pre-tanning products
such as a solution at 1-10% of aldehydes or synthetic
tannins; - sammying of the skins; - drying;
30 Wherein said drying allows dry and frayed skins to be
obtained and, next is carried out
- a stage of tanning by immersion in a solution of
mineral salts, vegetable tannin extracts or a mixture
thereof.

2. Procedure according to claim 1, characterized in that said vegetable tannin extracts are selected from among at least one extract of quebracho, of chestnut, of mimosa, of valonea, of tara, of grapeseed or 5 mixtures thereof.

3. Procedure according to claim 1, characterized in that said solution of mineral salts or vegetable tannin extracts also comprises at least one 10 greasing agent, dye or retanning agent to fill the skin.

4. Procedure according to claim 1, characterized in that said dry and frayed skins obtained after said drying are subjected to a stage of shaving 15 before carrying out said tanning by immersion.

5. Procedure according to claims 1 and 4, characterized in that in said shaving stage shavings of the dry and frayed skins are obtained which have 20 application in the manufacture of glues, gelatins, artificial guts (sausage casings), cosmetics and drugs.

6. Procedure according to claim 1, characterized in that said stages are carried out in a 25 continuous process.

7. Material obtained according to the stages defined in the procedure according to claim 1 excluding the tanning stage, whose material presents a dry 30 contraction temperature higher than 60°C and an apparent density lower than 0.6 g/cm³.

8. Material according to claim 7, characterized in that it is waterproofed or made water-repellent with a 35 solution that comprises fluorocarbon compounds, silicones

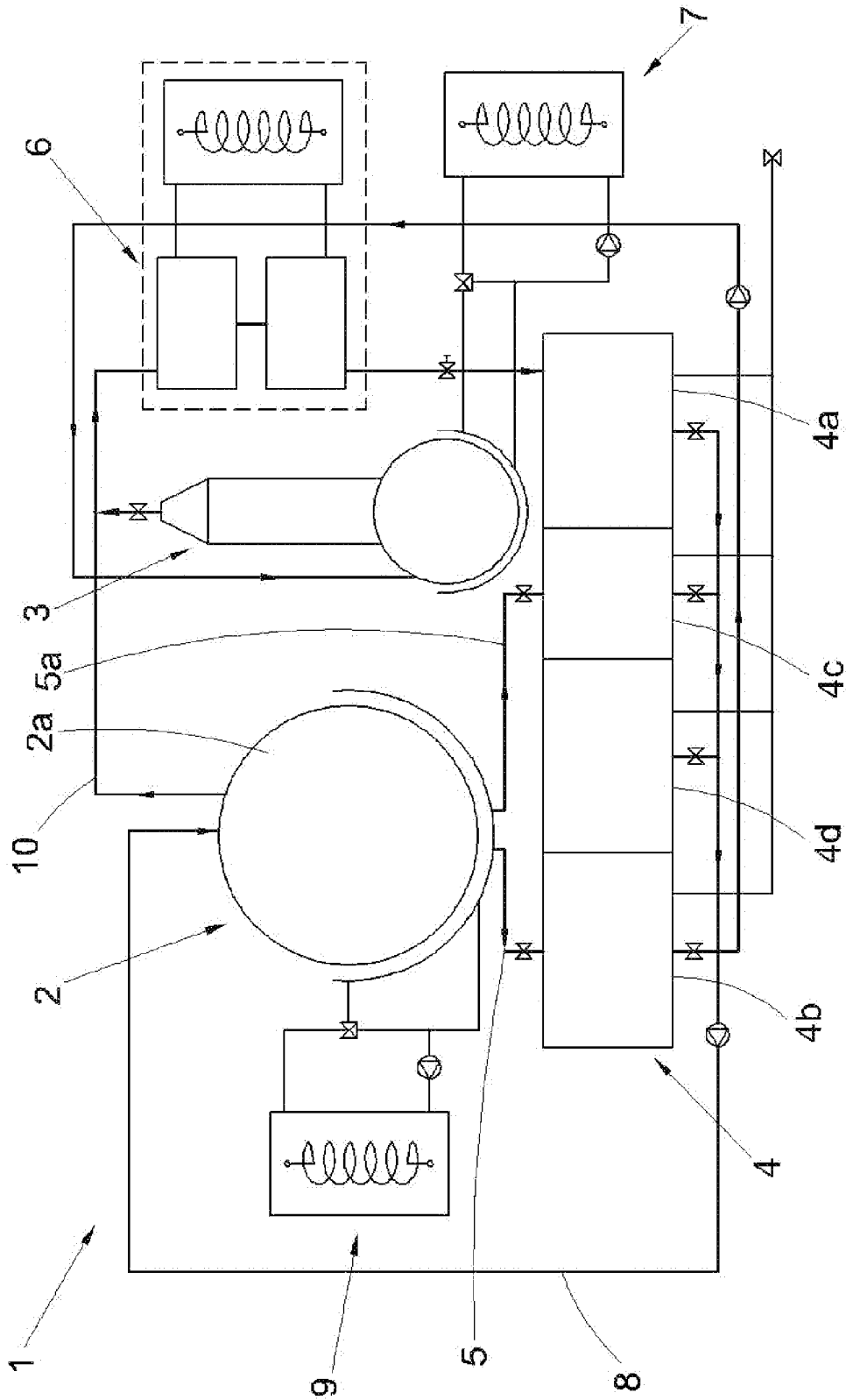
or others water-repellent or waterproofing agents.

9. Device for dehydrating and degreasing skins following option A) of the claimed procedure, 5 characterized in that it comprises;

- a machine for washing said skins by means of a water miscible solvent medium, allowing said machine to carry out a wash cycle that includes a number of consecutive wash stages of said skins with different fractions of 10 said solvent medium each one of said wash stages including the sammying of said skins by centrifugation,
- a distillation column to evaporate the solvent leaving as a residue the water and grease separated from said skins,
- 15 - a tank fitted with a compartment to recover, once condensed, the solvent medium coming from said distillation column, said tank being fitted with means to supply said washing machine with the recovered solvent, in such a way that said recovered solvent can be used in 20 a new wash cycle.

10. Device according to claim 9, wherein said tank includes a compartment for storing the effluent coming from the last wash stage of each cycle and means 25 to supply the effluent from this last wash stage to said washing machine, when a new wash cycle begins.

11. Device according to claim 9, which comprises means for drying the skins sammied on the way 30 out of said wash cycle, and means for condensing the solvent medium evaporated on the way out of drying, the condensed solvent being led to said tank so that it can be used in a new wash cycle.



Figure