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(54) Fur processing apparatus with liquid spray on scraper rollers

(57) The invention provides a fur processing apparatus, such as for processing mink fur, with a scraper unit with one or more rotating scraper roller (S) for removing fat and flesh from the leather side of the fur. A liquid spray unit is arranged to spray a liquid (L), e.g. water, onto one or more scraper rollers (S) so as to provide a liquid film (LF) on scraper blades of the scraper rollers (S). Hereby, it is possible to prevent fat and flesh from sticking to the scraper blades, thus destroying the scraping effect of the scraper rollers (S). E.g. water with a temperature of 40-60 °C may be used, and the water is preferably sprayed by means of a nozzle (N) towards one or two scraper blades immediately prior to entering into contact with the fur. In case of skinning machines which processed the fur with a sequence of more than one scraper unit, at least one of the scraper rollers (S) of the first scraper unit in the sequence is preferably sprayed with liquid (L).

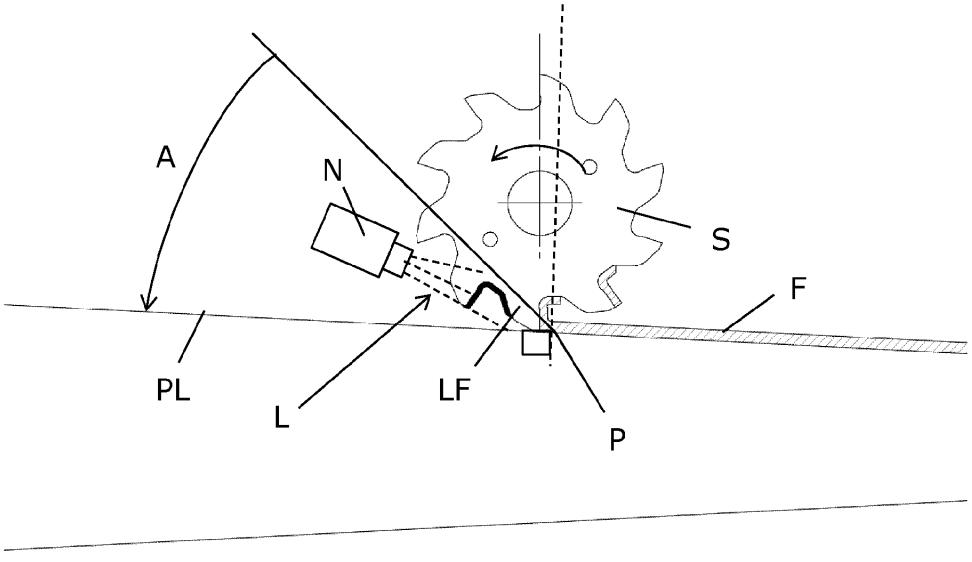

Fig. 1

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to the field of processing of fur, such as mink fur, and more specifically the invention provides a skinning or fleshing apparatus for scraping fat and flesh of a leather side of a fur.

BACKGROUND OF THE INVENTION

[0002] Processing of fur, e.g. mink fur, often includes a process of removing fat and flesh residues from the back side of the fur by means of a skinning or fleshing apparatus with rotating scraper rollers that remove the fat and flesh during contact with the back side of the fur under pressure.

[0003] An example of a fleshing apparatus is disclosed in EP 2 093 299 B1 by Pamutec. This apparatus has an elongated mandrel on which the fur is mounted with its fur side facing inwards. Several rotating scraper rollers and brushes inside the apparatus serve to remove fat and flesh and thus clean the fur while the mandrel is projected through the rotating scraper rollers which are pressed against the fur on the mandrel.

[0004] However, it is a problem that fat and flesh can sometimes be so sticky that it is not thrown off the scraper rollers due to centrifugal forces caused by the rotation of the scraper rollers. Thus, fat an flesh may add up between the scraper blades on the scraper rollers, thus reducing the scraping effect significantly. Sometimes, a complete stop and cleaning of the scraper rollers is required. Such problems can be reduced by the introduction of suction systems that serve to vacuum fat and flesh pieces off the scraper rollers. However, a suction system for this purpose is rather expensive, and further such system adds several single elements to the fleshing machine which increases the risk of break-down, and still further a separate cleaning procedure of such suction system is required.

SUMMARY OF THE INVENTION

[0005] Following the above description, it may be seen as an object of the present invention to provide a fur processing device which can function reliably without the need for a suction system to prevent fat and flesh from destroying the effect of the scraper rollers.

[0006] In a first aspect, the invention provides a fur processing apparatus, such as for processing mink fur, the apparatus comprising

- a mandrel, such as a movable mandrel, arranged for mounting of the fur with the fur side facing inwards,
- a first scraper unit comprising at least one scraper roller with a plurality of scraper blades, the at least one scraper roller being arranged to rotate and for being pressed into contact with the fur on the mandrel while the at least one scraper roller rotates, and
- a liquid spray unit arranged to spray a liquid onto the at least one scraper roller, such as water, so as to provide a liquid film on one or more of the plurality of scraper blades.

[0007] Such fur processing apparatus is advantageous for fleshing of fur, such as mink fur, since the problem of fat and flesh sticking to the scraper rollers can be eliminated or at least reduced by spraying liquid, e.g. water in rather small amounts on the scraper roller. By spraying liquid towards a back side of a scraper blade immediately before contact with the fur serves to provide a liquid film on the front side of the scraper blade which helsp to prevent fat and flesh from sticking to the scraper blade. Thus, the fat and flesh which is scraped off the fur by the scraper blade can easier be thrown off the scraper blade due to the centrifugal forces of the scraper roller rotation. Hereby, poor effect of the scraper rollers can be eliminated or at least reduced even without the use of a dedicated suction system to prevent the fat and flesh from sticking to the scraper rollers. The amount of water can be small, and the liquid spray unit can be implemented with low cost components, thus solving the same problem as an expensive and maintenance requiring suction system.

[0008] Further, with the added liquid film, it may under some operating conditions be possible to reduce the pressure applied to the scraper rollers for contacting the fur, and still obtain the desired scraping effect. Such reduced pressure can be advantageous for obtaining a high fur quality. This is due to a high scraping pressure which tends to press fat into the pores of the skin from the leather side of the fur, and such fat into the pores of the skin will in some cases result in unwanted fat spots on the fur side after a period of storage, thus reducing overall quality of the piece of fur.

[0009] Still further, at least part of the sprayed liquid, e.g. water, will end up on the fur during the scraping process. However, this can be seen as an advantages in apparatuses comprising a dispenser that adds sawdust or another material with particles with the purpose of absorbing fat remaining on the leather side of the fur after being processed by a set of scraper rollers in a first scraping unit.

[0010] In some embodiments, the liquid spray unit comprises at least one nozzle positioned in relation to the at least one scraper roller so as to spray liquid towards at least one point of a surface of the scraper roller. Such nozzle, or a set of a plurality of nozzles for each scraper roller, may be arranged to spray liquid in various patterns. However, it may especially be preferred to cover the length of the roller with a plurality of single jets, or with one single nozzle arranged to spray liquid in an elongated pattern oriented to cover the entire length of the scraper roller, or at least a large part of the length of the scraper roller. Thus, in some embodiments, the nozzle may be arranged to spray liquid over a width of 100° or more to cover the entire length or at least a large part of the length

of the scraper roller, whereas the spray pattern is preferably limited to such as below 60°, such as below 40°, such as below 20°, or even below 10°, perpendicular to that direction.

[0011] In preferred embodiments, the at least one nozzle may be positioned in relation to the at least one scraper roller such that it is arranged to spray liquid towards one side of the at least one scraper roller so as to provide a liquid film (LF) on one or more scraper blades prior to rotating into contact with the fur. Thus, to prevent the liquid from being thrown off due to centrifugal forces due to the rotation of the scraper roller, or to be sprayed onto fat and flesh not having left the scraper blades, it is preferred that the at least one nozzle is positioned on the side of the scraper roller upstream from scraper blade contact with the fur, thus spraying liquid on scraper blades immediately before they go into contact with the fur. Especially, the at least one nozzle is positioned so in relation to an axis of rotation of the at least one scraper roller that the at least one nozzle is positioned within an angular interval of 0° to 60°, seen in relation to a point of contact between the at least one scraper roller and the fur, and a plane extended by a surface of the mandrel at the point of contact between the at lest one scraper roller and the fur. More specifically, the angular interval may be 10° to 45°, such as 15° to 40°. Hereby, an appropriate liquid film is provided on the front side of a scraper blade immediately before entering into contact with the fur, even though the liquid is sprayed towards the back side of the scraper blade.

[0012] The liquid spray unit may be arranged to spray the liquid in atomized or at least partly atomized form. Hereby, a very small amount of liquid can be used, and still provide the necessary liquid film on the scraper blades. However, it is understood that various other forms of liquid spreading can be used to provide the liquid film.

[0013] The apparatus may comprise a second scraper unit comprising a plurality of scraper rollers, wherein the second scraper unit is arranged after the first scraper unit, seen in a direction of forward movement of the mandrel, and wherein a material dispenser is arranged between the first scraper unit and the second scraper unit, the material dispenser being arranged to apply an amount of particles, such as sawdust, to the fur. As already mentioned, the liquid spraying on one or more scraper rollers of the first scraper unit may have the effect that a small amount of liquid is applied to the fur, thus allowing a larger portion of the later applied particles, e.g. sawdust, to bind onto the fur, thereby absorbing more fat. Most preferably, all scraper rollers of the first scraper unit, i.e. before the material dispenser, are provided with a liquid spraying nozzle. It may be preferred that one or or a plurality of the scraper rollers of the second unit, i.e. after the material dispenser, are provided with liquid spraying nozzles, however at this point in the scraping process, it may be preferred not to spray liquid on any of the scraper rollers of the second unit.

[0014] The first scraper unit may comprise a set of horizontal scraper rollers and a set of vertical scraper rollers, and wherein the liquid spray unit is arranged to spray liquid towards a plurality of scraper rollers of the first scraper unit. It is preferred to provide liquid spraying to all scraper rollers of the first scraper unit, e.g. on two horizontal scraper rollers and on two vertical scraper rollers, since the scraper rollers of the first scraper unit are exposed to the largest amount of fat and flesh, and thus the advantageous effects of the liquid is expected to be at these scraper rollers. More specifically, the liquid spray unit may comprise a plurality of nozzles arranged to spray liquid towards respective scraper rollers of the first scraper unit.

[0015] The at least one scraper roller and the plurality of scraper blades may be formed by one monolithic structure with a generally cylindrical shape with the scraper blades formed thereon in the monolithic material, such as a polymeric monolithic material. However, the scraper roller may alternatively be formed by a roller body with separate scraper blade members arranged thereon.

[0016] The liquid spray unit may be arranged to spray a predetermined amount of liquid per time towards one scraper roller, such as within 0.1-10 liters per minute, such as within 0.2-5 liters per minute, such as within 0.3-3 liters per minute, such as within 0.4-1 liters per minute, during normal operation. However, the liquid spray unit may be arranged to vary the amount of liquid per time to be applied to one scraper roller, so as to provide an optimal effect in specific situations, and still to allow a minimum amount of liquid to be used.

[0017] In some embodiments, the liquid spray unit may comprise a controller arranged to control the liquid spraying. Such controller may be formed as part of the general controller of the apparatus, however it may be formed as a separate digital processor unit dedicated to control the liquid spraying. The controller may have various functions, such as controlling at least one of: an amount of liquid to spray, when to spray liquid, such as to switch on and off liquid spraying, such as to switch on liquid spraying when the at least one scraper roller enters into contact with the fur, and to switch off liquid spraying when the least one scraper roller is not in contact with the fur.

[0018] The liquid preferably has a temperature within 20-95°C, such as within 30-90°C, such as within 40-85°C, such as within 50-80°C, when being sprayed onto the at least one scraper roller. Hereby, having an elevated temperature compared to a normal environmental temperature, the optimal fat and flesh loosening effect is obtained, and further the task of pumping away the removed fat and flesh is facilitated.

[0019] Preferably, the liquid is water however other liquids could be used as well. E.g. the liquid may be water with an additive, such as a detergent or the like, and which is still not harmful for the fur. Thus, in simple embodiments, the liquid spray unit comprises pipes connected to a normal fresh water supply and with the pipe ends, e.g. with nozzles mounted thereon, pointing to-

wards one or more scraper rollers of the skinning or fleshing appratus. Especially, the liquid supply may be a normal hot water supply, or a normal cold or hot water supply on which an intermediate heater is installed to heat the water temperature up to such as 60-90 °C.

[0020] In a second aspect, the invention provides a method for cleaning a scraper roller in a fur processing apparatus, such as for processing mink fur, the method comprising

- pressing at least one scraper roller into contact with the fur on a mandrel while the at least one scraper roller rotates, and
- spraying liquid onto the at least one scraper roller, such as water, so as to provide a liquid film on one or more of the plurality of scraper blades on the at least one scraper roller.

[0021] It is understood that the same advantages as described for the first aspect apply as well for the second aspects, and the same principal embodiments from the first aspect apply as well for the second aspect. The first and second aspects may each be combined with any of the other aspects. These and other aspects of the invention will be apparent from and elucidated with reference to the embodiments described hereinafter.

BRIEF DESCRIPTION OF THE FIGURES

[0022] Embodiments of the invention will be described in more detail in the following with regard to the accompanying figures. The figures show one way of implementing the present invention and is not to be construed as being limiting to other possible embodiments falling within the scope of the attached claim set.

Fig. 1 shows an example of a liquid spray nozzle positioned to spray liquid on a scraper roller,

Fig. 2 shows a side view of a first embodiment of a partly open skinning maching with two sets of four scraper rollers,

Fig. 3 shows a detail of Fig. 2 where positions of liquid spray nozzles are indicated for nozzles for each scraper roller of one set of scraper rollers, and

Fig. 4 shows a side view of a second embodiment of a partly open skinning machine with two sets of four scraper rollers.

DETAILED DESCRIPTION OF AN EMBODIMENT

[0023] Fig. 1 shows a side view of a scraper roller S with 10 scraper blades formed monolithically on the scraper roller as protruding teeth. Typically, a scraper roller with 7-10 teeth is used. The scraper roller S is shown in position for normal operation, namely where it is pressed against a mandrel M which has a fur (not specifically shown) arranged thereon with its leather side facing outwards. During rotation (rotation direction is indicated by the arrow on the scraper roller S), the teeth of the scraper roller S serve to remove fat and flesh F from the leather side of the fur, and as seen, pieces of fat and flesh F are carried between the teeth of the scraper roller S and preferably thrown off the scraper roller S due to centrifugal forces before the teeth re-enter into contact with the fur after a full rotation.

[0024] To help to release such fat and flesh F pieces from the scraper roller S, a liquid spray unit according to the invention is provided. For simplicity, only a nozzle N of such unit is provided. The nozzle N is positioned near the scraper roller S, e.g. such as at a distance of 10 cm, such as 2-10 cm, such as 4-8 cm, from a peripery of the scraper roller S. The nozzle N sprays liquid L towards a back side of one or more scraper blade(s) of the scraper roller S with the purpose of providing a liquid film LF on a front side of the one or more scraper blade(s) immediately before entering into contact with the fur, which takes place at point P. To do so with a minimum amount of liquid L, e.g. water, the nozzle N is position on the side of the scraper roller S where fat and flesh F pieces have preferably been thrown off, thus allowing a liquid film LF to be provided on a front side of the scraper blade. A preferred angular interval A is indicated for position of the nozzle N. Preferably, the nozzle is positioned so in relation to an axis of rotation of the at least one scraper roller S that it is within A being 0-60°, seen in relation to the point of contact P between the scraper roller S and the fur, and a plane PL extended by a surface of the mandrel M at the point of contact P between the scraper roller S and the fur. More preferably, the nozzle N is positioned within A being 5-50°, more preferably within A being 10-45°.

[0025] It is understood that the nozzle N can spray liquid L in a pattern suitable to provide the liquid film LF taking into account a number of parameters such as the speed of rotation of the scaper roller S, the shape and number of scraper blades on the scraper roller S, and the actual position of the nozzle N in relation to the scraper roller S. However, in general the liquid film LF may be provided by various spraying patterns from one single jet of liquid to an atomization nozzle creating a cloud of liquid. Only one nozzle N is shown in Fig. 1, however depending on the length of the scraper roller S (i.e. a length of the scraper roller S perpendicular to the plane of Fig. 1), several single nozzles N may be positioned along the length of the scraper roller S to ensure that a proper liquid film LF is provided throughout the length of the scraper roller S. Especially, one single nozzle N may be positioned at a distance and with a spraying pattern which is wide enough to cover the entire length of the roller, while the height of the spraying pattern is preferably rather narrow.

[0026] The function of the liquid spray is improved, if the temperature of the liquid is elevated, e.g. 40-60°C or

even more, such as 60-90°C. This elevated temperature both serves to prevent the fat and flesh pieces to stick to the scraper blade, but it also helps to facilitate removal of the fat and flesh pieces. Thus, water from a normal hot water supply source can preferably be used as liquid. Preferably, the amount of water used is small, i.e. as small as possible provided that a suitable fat and flesh loosening effect is obtained. However, it has been found that less that below 10 liters per minute is sufficient, and even below 2 liters per minute can provide the desired effect.

[0027] Fig. 2 shows an example of a first embodiment of a skinning machine where the liquid spray unit can advantageously be implemented to provide an efficient function of the scraper rollers. On the drawing, parts of the cover and other elements have be removed from the machine to show the scraper rollers. An elongated mandrel M with a rectangular cross section is arranged for receiving a mink fur with its head end arranged at the tip of the mandrel M, i.e. to the right on Fig. 2. The mandrel M is shown in its initial position where it is prepared for a fur to be mounted. During operation, the mandrel M is driven along its longitudinal axis, i.e. in the direction indicated by the bold arrow, so as to process the fur by a scraper arrangement with rotating scraper rollers arranged to remove remaining fat and flesh pieces on the leather side of the fur.

[0028] The scraper arrangement has two scraper units with scraper rollers with an intermediate sawdust dispenser SD arranged to sawdust onto the fur. The first unit of scraper rollers by which the fur is processed when the mandrel M is driven forwards, has four scraper rollers, of which only three are visible, namely two horizontal scraper rollers S1_1, S2_1 which are placed on opposite sides of the mandrel M during operation, and two vertical scraper rollers of which only the nearest one S3_1 is visible. The not visible vertical scraper roller is placed behind S3_1, and during operation the two vertical scraper rollers S3_1 are placed on opposite sides of the mandrel M. The fours scraper rollers S1_1, S2_1, S3_1 are thus placed to cover all sides of the fur when placed on the rectangular mandrel M. Fat and flesh removed by the scraper rollers S1_1, S2_1, S3_1 is pumped away by a motor driven pump FP. After processing by the first scraper unit, the fur is provided with sawdust from the sawdust dispenser SD, and subsequently, when the mandrel M is driven further forward, the fur is processed by a second scraper unit to remove the last pieces of fat and flesh as well as the sawdust which serves to absorb fat. Three out of the four scraper rollers of the second scraper unit are visible S1_2, S2_2, S3_2. An immobilzed fat scraper SF is provided downstream of scraper rollers S 1_1 and S 2_1.

[0029] The liquid spray unit according to the invention is not shown in Fig. 2, but in preferred versions at least one spray nozzle is positioned to provide liquid spray on all of the four scraper rollers of the first scraper unit, i.e. S1_1, S2_1, S3_1 and the second not visible vertical scraper roller. The scraper rollers of the first scraper unit are in contact with the fur when still a large portion of fat and flesh is present, and thus these scraper rollers S1_1, S2_1, S3_1 profit the most from the liquid film to prevent fat and flesh pieces sticking to the scraper blades. If preferred, one or more scraper rollers S1_2, S2_2, S3_2 of the second scraping unit may also be provided with liquid spraying.

[0030] Fig. 3 shows a detail of the first scraper unit of the skinning machine of Fig. 2 where an example of a liquid spray unit is sketched. As seen, nozzles N1_1, N2_1, N3_1 are positioned to spray liquid on respective scraper rollers S1_1, S2_1, S3_1. The nozzles N1_1, N2_1, N3_1are positioned in relation to the scraper rollers S1_1, S2_1, S3_1 as indicted and explained in connection with Fig. 1, and for the nozzle N3_1 on the vertical scraper roller S3_1, it is seen that it is position near the middle of the length of the scraper roller S3_1 so as to ensure a scattering of the liquid sprayed towards the scraper roller S3_1 in order to provide a liquid film covering the entire length of the scraper roller S3_1. The same position of the nozzles N1_1, N2_2 in relation to the scraper rollers S1_1, S2_1 is also preferred. However, as already mentioned, more nozzles may be used for each scraper roller, if preferred.

[0031] The nozzles N1_1, N2_1, N3_1 are supplied with liquid from a liquid pipe system which is supplied with liquid from a liquid supply LS, e.g. a normal hot water or cold water supply. As seen, the liquid supply LS is connected to the nozzles N1_1, N2_1, N3_1 via a controller C which serves to control the amount of liquid to be supplied, and also to start supply of liquid when the scraper rollers S1_1, S2_1, S3_1 enter into contact with the fur, and to stop the supply of liquid when the scraper rollers S1_1, S2_1, S3_1 are not in contact with the fur. Even though it is to be understood that the invention can be performed by a simple supply of water from a pipe connected to a cold or hot water supply which is manually turned on or off, it is preferred to have a controller C so as to allow automated control of the liquid spraying and still with a minimum generation of waste water. The controller C may be controlled by a processor running a predetermined control algorithm, e.g. the controller can be implemented as a PLC or the like controlling one or more valves. In some versions, the controller may be arranged to vary the amount of liquid or the liquid pressure in response to one or more parameters, such as liquid temperature, speed of rotation of the scraper rollers etc.

[0032] The controller C may either provided as a separate liquid spray unit controller C, or it can alternatively be implemented as an integrated part of the general control of the skinning machine. E.g. a unit of one or more valves may be controlled by a single control signal. One common liquid supply to all nozzles may be controlled by control of one or more valves, or alternatively, each nozzle may be controllable, thus providing a constant liquid supply to all nozzles, and then controlling the liquid supply individually for each nozzle by means of a signal,

such as an air signal, an electric signal, or a mechanical signal.

[0033] Fig. 4 shows an example of a second embodiment of skinning machine. As in the embodiment of Fig. 2, an elongated mandrel M with a rectangular cross section is arranged for receiving a mink fur with its head end arranged at the tip of the mandrel M, i.e. to the right on Fig. 4. The machine operates in a similar manner as the machine of Fig. 2.

[0034] The scraper arrangement has two scraper units with scraper rollers with an intermediate sawdust dispenser SD arranged to sawdust onto the fur. The first unit of scraper rollers by which the fur is processed when the mandrel M is driven forwards, has four scraper rollers, of which only three are visible, namely two horizontal scraper rollers S1_1, S2_1 which are placed on opposite sides of the mandrel M during operation, and two vertical scraper rollers of which only the nearest one S3_1 is visible. The not visible vertical scraper roller is placed behind S3_1, and during operation the two vertical scraper rollers S3_1 are placed on opposite sides of the mandrel M. The fours scraper rollers S1_1, S2_1, S3_1 are thus placed to cover all sides of the fur when placed on the rectangular mandrel M. Fat and flesh removed by the scraper rollers S1_1, S2_1, S3_1 is pumped away by a motor driven pump. After processing by the first scraper unit, the fur is provided with sawdust from the sawdust dispenser SD, and subsequently, when the mandrel M is driven further forward, the fur is processed by a second scraper unit to remove the last pieces of fat and flesh as well as the sawdust which serves to absorb fat. Three out of the four scraper rollers of the second scraper unit are visible S2_2, S3_2, and S4_2.

[0035] The liquid spray unit may be provided in a similar manner as in the embodiment of Fig. 2.

In the embodiments of Figs. 2 and 4 alike, a second sawdust dispenser may be provided downstream of the last set of scraper units S 2_2, S 3_2 and S 4_2 in order to achieve a further drying effect upon the fur.

[0036] In summary, embodiments of the present invention provide a fur processing apparatus, such as for processing mink fur, with a scraper unit with one or more rotating scraper roller S for removing fat and flesh from the leather side of the fur. A liquid spray unit is arranged to spray a liquid L, e.g. water, onto one or more scraper rollers S so as to provide a liquid film LF on scraper blades of the scraper rollers S. Hereby, it is possible to prevent fat and flesh from sticking to the scraper blades, thus destroying the scraping effect of the scraper rollers S. E.g. water with a temperature of 40-60 °C may be used, and the water is preferably sprayed by means of a nozzle N towards one or two scraper blades immediately prior to entering into contact with the fur. In case of skinning machines which processed the fur with a sequence of more than one scraper unit, at least one of the scraper rollers S of the first scraper unit in the sequence is preferably sprayed with liquid L.

[0037] In all embodiments of the present invention, the mandrel M preferably has a closed, planar outer surface in order to avoid fat and flesh entering cavities or depressions therein. The mandrel is preferably solid in order to allow it to be suspended at one end only and yet to be able carry its own weight. The mandrel is conveniently washed by the liquid spray unit as it travels there across.

[0038] Although the present invention has been described in connection with the specified embodiments, it should not be construed as being in any way limited to the presented examples. The scope of the present invention is set out by the accompanying claim set. In the context of the claims, the terms "comprising" or "comprises" do not exclude other possible elements or steps. Also, the mentioning of references such as "a" or "an" etc. should not be construed as excluding a plurality. The use of reference signs in the claims with respect to elements indicated in the figures shall also not be construed as limiting the scope of the invention. Furthermore, individual features mentioned in different claims, may possibly be advantageously combined, and the mentioning of these features in different claims does not exclude that a combination of features is not possible and advantageous.

Claims

1. A fur processing apparatus, such as for processing mink fur, the apparatus comprising

   - a mandrel (M) arranged for mounting of the fur with the fur side facing inwards,
   - a first scraper unit comprising at least one scraper roller (S) with a plurality of scraper blades, the at least one scraper roller (S) being arranged to rotate and for being pressed into contact with the fur on the mandrel (M) while the at least one scraper roller (S) rotates, and
   - a liquid spray unit arranged to spray a liquid (L) onto the at least one scraper roller (S), such as water, so as to provide a liquid film (LF) on one or more of the plurality of scraper blades.

2. Apparatus according to claim 1, wherein the liquid spray unit comprises at least one nozzle (N) positioned in relation to the at least one scraper roller (S) so as to spray liquid (L) towards at least one point of a surface of the scraper roller.

3. Apparatus according to claim 2, wherein the at least one nozzle (N) is positioned in relation to the at least one scraper roller (S) such that it is arranged to spray liquid (L) towards one side of the at least one scraper roller (S) so as to provide a liquid film (LF) on one or more scraper blades prior to rotating into contact with the fur.

4. Apparatus according to claim 3, wherein the at least

one nozzle (N) is positioned so in relation to an axis of rotation of the at least one scraper roller (S) that the at least one nozzle (N) is positioned within an angular interval (A) of 0° to 60°, seen in relation to a point of contact (P) between the at least one scraper roller (S) and the fur, and a plane (PL) extended by a surface of the mandrel (M) at the point of contact between the at lest one scraper roller (S) and the fur.

5. Apparatus according to claim 4, wherein the angular interval (A) is 10° to 45°, such as 15° to 40°.

6. Apparatus according to any of the preceding claims, wherein the liquid spray unit is arranged to spray the liquid (L) in atomized or at least partly atomized form.

7. Apparatus according to any of the preceding claims, comprising a second scraper unit comprising a plurality of scraper rollers (S1_2, S2_2, S3_2), wherein the second scraper unit is arranged after the first scraper unit, seen in a direction of forward movement of the mandrel (M), and wherein a material dispenser (SD) is arranged between the first scraper unit and the second scraper unit, the material dispenser (SD) being arranged to apply an amount of particles, such as sawdust, to the fur.

8. Apparatus according to any of the preceding claims, wherein the first scraper unit comprises a set of horizontal scraper rollers (S1_1, S2_1) and a set of vertical scraper rollers (S3_1), and wherein the liquid spray unit (N) is arranged to spray liquid towards a plurality of scraper rollers (S1_1, S2_1, S3_1) of the first scraper unit.

9. Apparatus according to claim 8, wherein the liquid spray unit comprises a plurality of nozzles (N1_1, N2_1, N3_1) arranged to spray liquid towards respective scaper rollers (S1_1, S2_1, S3_1) of the first scraper unit.

10. Appartus according to any of the preceding claims, wherein the at least one scraper roller (S) and the plurality of scraper blades are formed by one monolithic structure with a generally cylindrical shape with the scraper blades formed thereon in the monolithic material, such as a polymeric monolithic material.

11. Apparatus according to any of the preceding claims, wherein the liquid spray unit is arranged to spray a predetermined amount of liquid per time towards one scraper roller, such as within 0.1-10 liters per minute, such as within 0.2-5 liters per minute, such as within 0.3-3 liters per minute, such as within 0.4-1 liters per minute, during normal operation.

12. Apparatus according to any of the preceding claims, wherein the liquid spray unit comprises a controller (C) arranged to control at least one of: an amount of liquid (L) to spray, when to spray liquid (L), such as to switch on and off liquid spraying, such as to switch on liquid spraying when the at least one scraper roller (S) enters into contact with the fur, and to switch off liquid spraying when the least one scraper roller (S) is not in contact with the fur.

13. Apparatus according to any of the preceding claims, wherein the liquid (L) has a temperature within 20-95°C, such as within 30-90°C, such as within 40-85°C, such as within 50-80°C, when being sprayed onto the at least one scraper roller (S).

14. Apparatus according to any of the preceding claims, wherein the liquid (L) is water, such as water with an additive.

15. Method for cleaning a scraper roller in a fur processing apparatus, such as for processing mink fur, the method comprising

- pressing at least one scraper roller (S) into contact with the fur on a mandrel (M) while the at least one scraper roller (S) rotates, and
- spraying liquid (L) onto the at least one scraper roller (S), such as water, so as to provide a liquid film (LF) on one or more of the plurality of scraper blades on the at least one scraper roller (S).

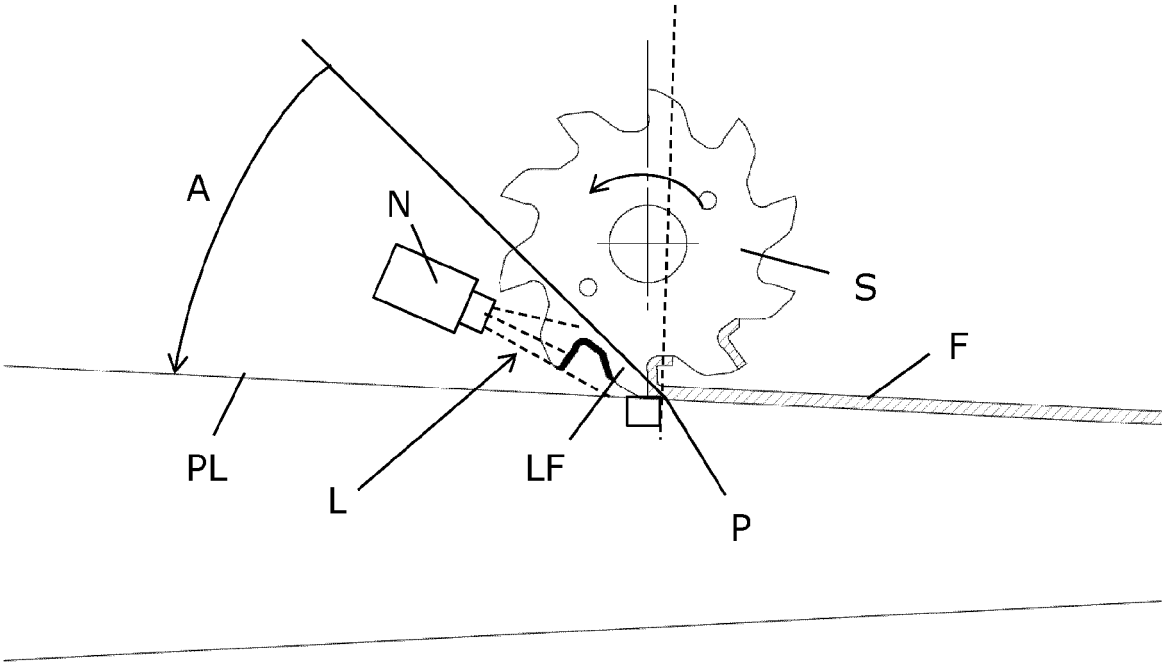

Fig. 1

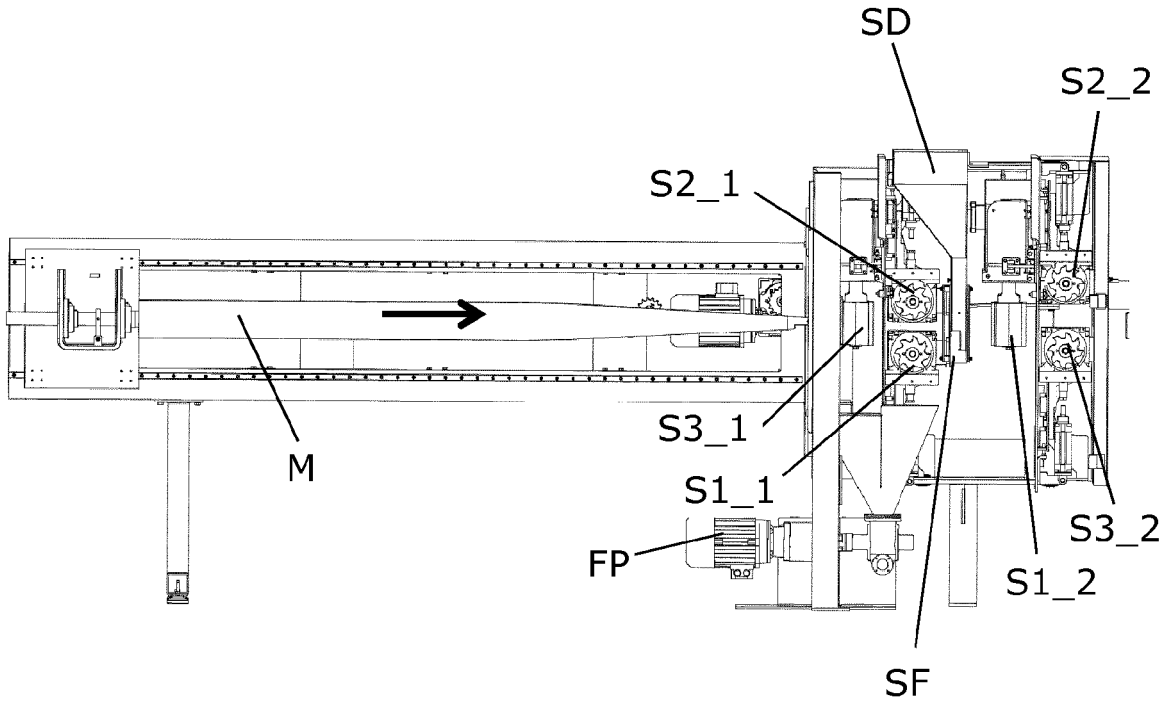

Fig. 2

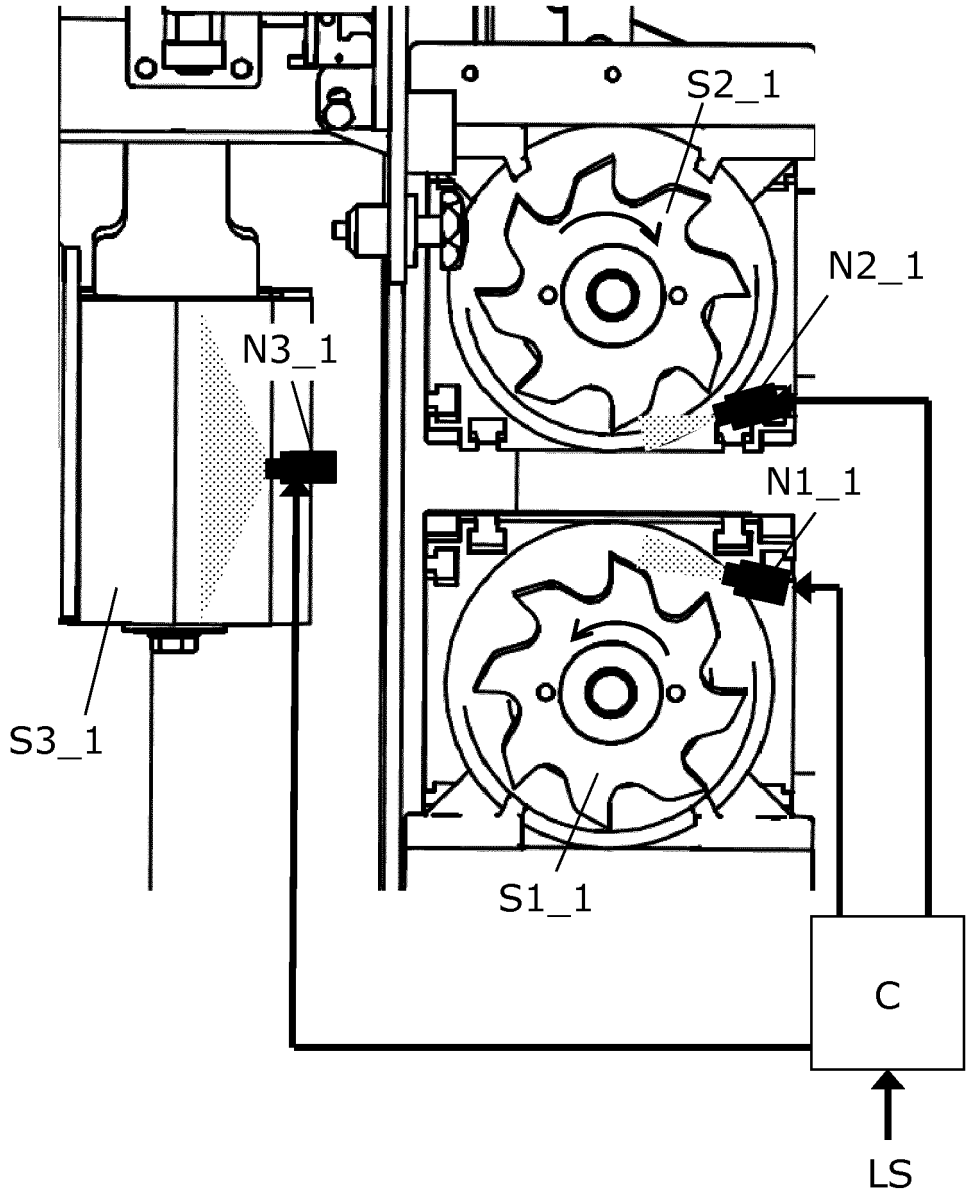

Fig. 3

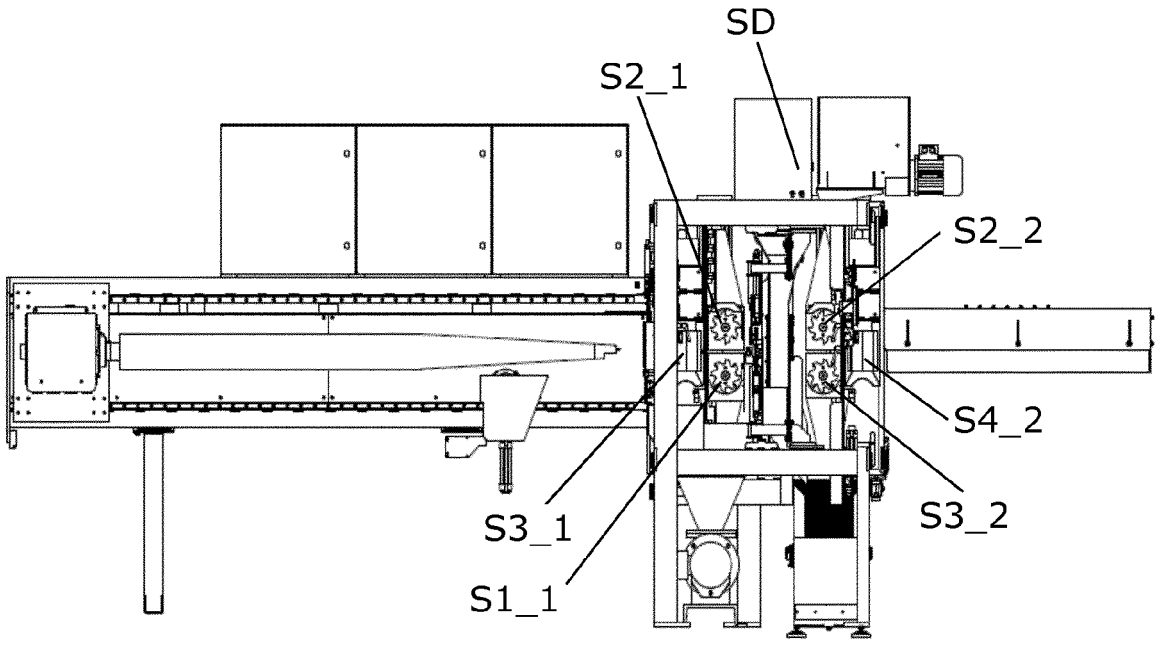

Fig. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 12 19 2063

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
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