



(11)

EP 2 093 299 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
26.08.2009 Bulletin 2009/35

(51) Int Cl.:

C14B 15/06 (2006.01)

(21) Application number: **09153313.3**

(22) Date of filing: **20.02.2009**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL
PT RO SE SI SK TR**
Designated Extension States:
AL BA RS

(30) Priority: 21.02.2008 DK 200800246

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(54) **Apparatus for processing fur**

(57) The invention concerns an apparatus (1) for fur processing which performs an automated removal of all flesh and fat residue from the skin side of a fur (2). The apparatus includes an elongated tapering mandrel (3) upon which the fur is drawn with the fur side facing inwards and with the head end (6) of the fur at the thinnest end (7) of the mandrel, where the fur is scraped by at least one roller scraper unit (8), which is peculiar in that the roller scraper unit is furthermore adapted with at least

one secondary scraper roller (16) which during rotation is adapted to transmit a tangential friction force to the fur on the mandrel in a direction towards the thinnest end of the mandrel.

Hereby is achieved that the roller scraper unit in a single operation can perform both primary and secondary scraping, where primary scraping removes the immediately accessible flesh and fat from the skin side, and secondary scraping loosens all the flesh and fat located under the forelegs on the fur.

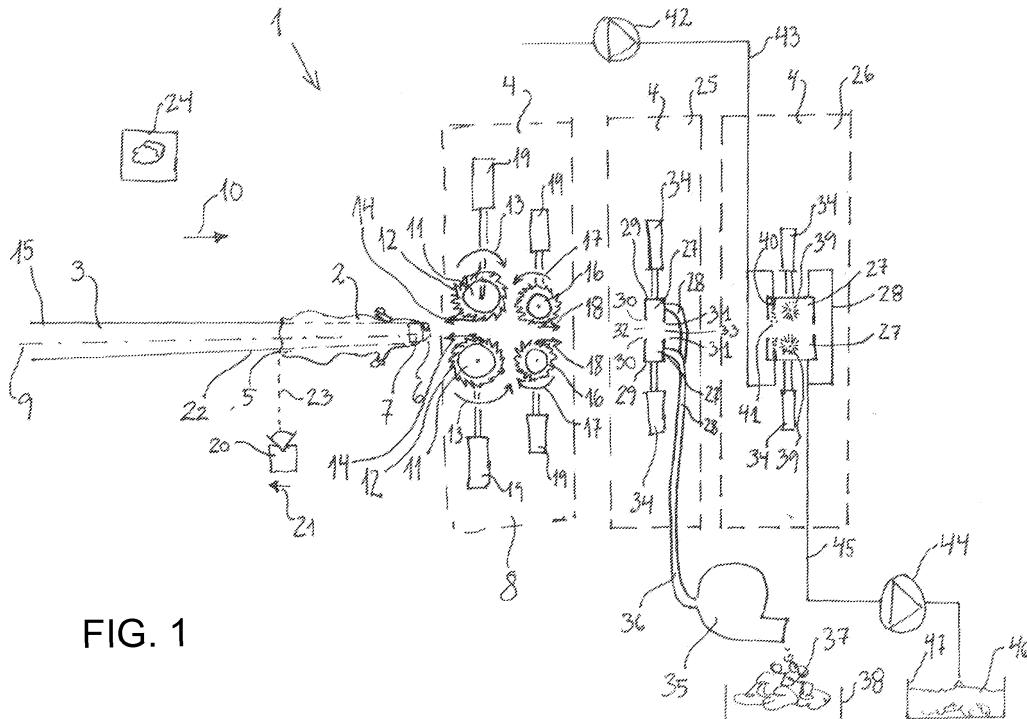


FIG. 1

Description**Field of the Invention**

[0001] The present invention concerns an apparatus for processing fur, preferably mink fur, and of the kind specified in the preamble of claim 1.

Background of the Invention

[0002] Furs have been used for clothing far back in human history, as it has been expedient to use the furs that remained when an animal had been shot and eaten. The durability of the furs has been one of the important factors of man's continued ability to regulate the body temperature and thereby ensure survival.

[0003] Fur products of high quality have thus been produced through thousands of years of human experience with fur processing. These would be e.g. from mink, fox and ermine. In addition to the growth conditions of the animals, the subsequent treatment of the dead animal's fur is of great importance to the final quality.

[0004] At the same time, the refinement of the fur product is dependent on the possibility of getting a certain income such that the fur production may pay off. The earning capacity is partly controlled by the end quality of the fur at the presentation and trading on a fur auction, and partly controlled by minimising costs in the production process.

[0005] An important cost factor in the production process is the treatment of the fur from the time when the animal has been put down until a finished fur has been put on a pelting board and ready for sale.

[0006] When the fur animal has been put down and skinned, it is necessary to remove all flesh and fat residues on the inner side of the fur, the skin side. This is done partly to prevent these residues from rotting and partly in order so flesh and fat will not to contaminate the fur side of the fur.

[0007] The work with the fur processing has hitherto been very demanding in manpower, as there many subprocesses have been included, with manual working or manual shifts between partly automated processes.

[0008] Since the period of time for the killing of the animals and the subsequent fur processing is highly concentrated in a few weeks of the year, it is of great importance for the fur producer to automate as large part of the fur processing process as possible in order to reduce the risk of lacking the required manpower. At the same time, the sensitivity caused by rising pay level and the openings due to improved price optimisation may be improved by increased automation.

[0009] A large amount of sawdust is used for the fur processing for absorbing flesh and fat residue to prevent contamination of the fur side of the fur during the process of scraping off fat and flesh residue from the skin side. As the prior art scraping apparatuses cannot remove all fat and flesh residue from the skin side in a secure way,

the use of sawdust is a necessity in order to ensure an optimal result of the fur processing. For example, fat and flesh residues often remain under the forelegs on the fur. However, the sawdust often gets well stuck in the fur which subsequently has to go through several processes, automatic as well as manual, in order to ensure that all sawdust is removed from the finished fur product.

[0010] The prior art methods of scraping fat and flesh residues off the skin side consist of different types of fur processing apparatuses, including at least one conical or tapering mandrel and one or more scraper units.

[0011] The fur is drawn on the tapering mandrel with the fur side facing inwards such that the skin side is exposed and ready for being worked by one or more scraper unit which are part of the fur processing apparatus.

[0012] The tapering mandrels may be:

- of different shape, such as circular, oval or rectangular cross-section;
- disposed horizontally or vertically during the scraping process;
- inserted in a scraper unit or the scraper unit can be moved against the mandrel;
- rotating or non-rotating;
- with or without fastening the fur at its hind paw end;
- provided with a cleaner that cleans the mandrel, e.g. by scraping, brushing, flushing with clean water or water with chemicals, and wiping off, or a combination of these processes.

[0013] The scraping units may include:

- A roller scraper unit with one or more scraper rollers, e.g. four rollers by a rectangular mandrel, where the rollers are mutually offset in pairs. Scraping residue may be sucked off in immediate vicinity of the scraper rollers. By all the prior art scraper rollers, the fur is acted on in a direction towards the thick end of the mandrels in order to ensure that the fur does not fall off, and to have the tangential action of force from the scraper roller distributed across the fur such that the force is evenly transmitted via the fur to the base (the mandrel) without damaging the fur. A scraper roller is rotated by means of a motor, and in use the scraper roller passes across the skin surface under the action of a pressing unit which may be with setable pressure. The prior art scraper roller is a moulded unit in which the scraper blades are an integral part of the roller. Frequently, there are seven blades on the scraper roller, and it is typically made of nylon or rubber as a jointly moulded unit. The cutting edges of the blades may be damaged by striking a hard object, such as unremoved claws or hind paws on the fur. A damage will entail that the entire prior art type of scraper roller has to be scrapped if it is not possible to re-sharpen it in a satisfactory way.

- An after-scraping unit where one or more scraper

blades, or a set of scraper blades, pass across the skin surface under the action of a pressing unit which may be with setable pressure. When using a set of scraper blades it is frequently used to dispose these such that the opening formed between the cutting edges in the plane of the latter corresponds to the cross-section of the mandrel, as the opening between the cutting edges can be varied depending on the increasing or decreasing cross-sectional area of the mandrel. Scraping residue may be sucked away or collected under the after-scraping unit.

- A double after-scraping unit where a set of scraper blades are made U-shaped and with two cutting edges on each blade. As by the above after-scraping unit, an opening is formed between each set of cutting edges in the plane of the latter, corresponding to the cross-section of the mandrel. Between the two cutting edges on the U-shaped scraper blade a cleaning chamber appears during use when the U-shaped scraper blade touches the inner side of the fur on the mandrel. Scraping residue may be sucked off from this cleaning chamber. The two sets of cutting edges may be mutually offset such that an opening between the cutting edges in a plane with each set of these have different cross-sections.

[0014] By the prior art fur processing apparatuses, a manual measurement is to be entered into the control unit of the apparatus. The control unit is then programmed to adjust the pressure for the pressure units acting on the scraper units to exert a given desired pressure against the skin side of the fur.

Object of the Invention

[0015] The object of the invention is to provide an apparatus for fur processing which performs an automated removal of all flesh and fat residue from the skin side of a fur.

Description of the Invention

[0016] According to the present invention, this object is achieved by an apparatus of the type specified in the introduction, which is peculiar in that the roller scraper unit is furthermore adapted with at least one secondary scraper roller which during rotation is adapted to transmit a tangential friction force to the fur on the mandrel in a direction towards the thinnest end of the mandrel.

[0017] Hereby is achieved that the roller scraper unit in a single operation can perform both primary and secondary scraping, where primary scraping removes the immediately accessible meat and fat from the skin side, and secondary scraping loosens all the meat and fat located under the forelegs on the fur.

[0018] The elongated tapering mandrel upon which the fur is drawn with the fur side facing inwards is provided

with the thinnest end at the point where the area of a cross-section perpendicular to the longitudinal axis of the mandrel is the least.

[0019] In a preferred variant of the invention, during rotation the at least one secondary scraper roller is adapted to transmit a tangential friction force which is less than the tangential friction force from a primary scraper roller.

[0020] This provides the advantage that it is not necessary to fasten the fur at the hind paws in order to ensure that the fur does not slide off the tapering mandrel. Moreover, it is achieved that the fur is not pulled too much as it otherwise may be damaged or torn in case of minor cuts or other weak spots in the fur.

[0021] In a further preferred variant of the invention, at least two primary scraper rollers are arranged for a first processing of the fur, and the at least one secondary scraper roller is arranged for a subsequent processing of the fur.

[0022] Thus is achieved that most of the flesh and the fat is removed from the skin side before the secondary roller counter-scrapes. The secondary roller may thereby remove the remaining fat and flesh residue located under the forelegs on the skin side.

[0023] It is possible to mount the motors driving the scraper rollers in a way such that no motors are located under the place where the scraping process occurs. Thereby is avoided that the motors break down due to the influence from the scraped fat and flesh residue.

[0024] In a particular embodiment, the apparatus may be arranged with a unit for automatic measurement of the extension of the fur on the mandrel.

[0025] By automating the measuring of the length of the tapering mandrel covered by the fur, the operator does not need to measure and enter the length of a fur when changing to fur coming from a different race or different sex.

[0026] The automatic measurement may be effected by providing a strip of a material which is recognisable to an optical unit on the mandrel. When the optical unit can detect the recognisable material, this part of the surface of the mandrel will be free from fur. During use of the apparatus, where a fur is put on the mandrel, the optical unit is moved from a position for detecting the thinnest end of the mandrel in a direction toward the thickest end of the mandrel. When the optical unit detects the recognisable material, the position of this measurement is detected, and the data of the position are transmitted to the control unit of the apparatus.

[0027] An automated measurement will save time for the operator and reduce the risk of human error in the fur processing.

[0028] In a further embodiment, the shaft of any scraper roller may be connected with a pressing unit which is intended for bringing the scraper roller in contact with the fur by a programmably setable pressure as well as bringing the scraper roller out of contact with the fur, respectively, preferably based on data from the unit for automatic measurement of the extension of the fur and on

input data about the nature of the fur, such as race or sex of the animal.

[0029] Hereby is achieved that the scraper roller scrapes sufficiently hard for the fur to be scraped as much as possible without the fur being damaged or torn. Furthermore, it is achieved that one may let the secondary roller stop or run with less pressure after the forelegs such that the fur is not worn too much and damaged thereby.

[0030] The pressure unit can be an actuator, e.g. hydraulic or pneumatic, or it may consist of a spring or of resilient material.

[0031] Entered data about the nature of the fur, such as race or sex of the animal, will determine how much pressure to be applied on the fur by the pressure units. Due to biological differences in the animals' build, furs from e.g. male fur animals will require greater pressure on the scraper unit than furs from female fur animals in order to sufficiently remove fat and flesh residue from the skin side. In order to pre-program an optimal process for the scraping of a given type of fur, there will be required one or more test scrapings from which the most optimal fur processing of a fur from a given type of animal is decided.

[0032] The automatic measurement of the extent of the fur is indicated above, and data from this measurement will form part of the program of the control unit as to which pressure the fur is to be applied by the scraper units. The position of the forelegs on a fur will thus have a calculateable distance from the thinnest end of the mandrel, as the animals' proportions for a given race are within an acceptable tolerance.

[0033] In a particular variant of the invention, the projecting scraper blades of the at least one secondary scraper roller may be replaceable.

[0034] The option of replacing scraper blades on the scraper roller will mean a reduced cost for the scraper rollers used in the fur processing, as the replaceable blades may be designed as a more simple and thereby cheaper wearing part which is just mounted in a cutout in the centre part of the scraper roller and retained therein. Finally, it is possible to use scraper blades with different hardness on the same centre part. The replaceable scraper blade can be made of e.g. rubber or nylon and have varying hardness. With a scraper unit may be enclosed an extra set of centre parts for the scraper rollers which can be ready with new scraper blades thereon such that the scraper roller can be replaced rapidly, e.g. at the time of the year where the scraper unit is used much.

[0035] This embodiment of the invention also provides the possibility of replacing only a single scraper blade on the scraper roller in case that a single or a few scraper blades are damaged. Thereby it is avoided to replace the entire scraper roller with the substantial cost this entails. The centre part of the scraper roller can be designed of e.g. stainless steel or aluminium.

[0036] Moreover, it is possible to have replaceable scraper blades on the primary scraper rollers such that

the advantages provided by this variant of the invention is also utilised in the case of the primary scraper roller.

[0037] In a further particular variant, the projecting scraper blades of the at least one secondary scraper roller may be reversible.

[0038] By combining the above possibility of replacing scraper blades with making the scraper blades reversible, a saving in the cost of scraper blades for the scraper roller may additionally be expected. The reversible scraper blade can be provided with a flat rectangular plate with cutting edges on both longitudinal edges.

[0039] Moreover, it is possible to have reversible scraper blades on the primary scraper roller such that the advantages provided by this variant of the invention is also utilised in the case of the primary scraper roller.

[0040] In a further preferred embodiment, the apparatus has additionally at least one scraper unit in the form of a double after-scraping unit containing a cleaning chamber with suction, and where the cleaning chamber is arranged with a rotatable brush.

[0041] The use of a double after-scraping unit provides greater certainty to the removal of excess fat and flesh residue from the skin side coming from the roller scraping of the fur. By providing a rotating brush in the cleaning chamber, further certainty as to a good result is achieved, as the skin side is brushed free from fat and flesh residue and possible skin shreds that have not been removed by the preceding scraping action. The brush may rotate both ways, depending on wish, as one may possibly have two double after-scraping units with rotating brushes, where the brushes rotate one way in the first double after-scraping unit, and the opposite way in the second double after-scraping unit. The brushes may be of different type and hardness.

[0042] In a particularly preferred embodiment, the cleaning chamber is arranged with a nozzle for supplying liquid under pressure.

[0043] Hereby is achieved that the skin side is flushed by a liquid whereby possible remaining minor residues of fat, flesh and skin shreds are removed.

[0044] The liquid may be pure water, or it may be liquid with various kinds of cleaning agents added to the liquid. It may also be advantageous to the desired fat loosening action of the invention in this variant to use hot water or steam. The suction stub of the cleaning chamber will provide for collecting contaminated water so that it is avoided that the fur is soaked and the fur side is contaminated or damaged. Finally, according to this variant it is possible by the invention to apply a preservative to the skin side which prevents subsequent drying of the fur.

[0045] When the fur has been through the apparatus with the described processes according to the invention in different combinations, it will be possible to avoid using sawdust in the fur working process. This will mean a great saving in terms of work and time in the fur treatment process as well as acquiring and disposing of sawdust for the fur production is rendered superfluous.

[0046] In order to finish the entire fur treatment process

without additional manual handling, the apparatus may be with a removing device after the last scraper unit which removes the fur from the mandrel and possibly turns it with the fur side out during mounting on a pelting board. Depending on the demands of the end customers to the quality of the product, before mounting on pelting board a visual check of the skin side of the fur may be performed so as to ensure that the skin side is in the proper condition.

[0047] A further variant of the invention may be that every scraper unit on the apparatus is mounted on a hinged frame.

[0048] Hereby is achieved that all scraper unit can be pivoted out for easy servicing. The individual parts of the roller scraper unit may also be mounted on hinged frames or arms such that e.g. each scraper wheel can be pivoted out for easy service and replacement of rollers.

[0049] In order to ensure a comfortable working environment for the operator, the fur treatment apparatus will be provided with one or more shielding boxes around the scraper units.

[0050] In a particular embodiment, the at least one elongated tapering mandrel in the apparatus for fur processing may be provided with one or more heating elements in the mandrel.

[0051] Hereby is achieved the possibility of heating the mandrel to a surface temperature of between 30 and 40°C, meaning that fat residues coming from the machining process will not solidify and accumulate on the surface of the mandrel. The mandrel is thus better prepared to be sufficiently cleaned by a cleaner that cleans the mandrel, e.g. by scraping, brushing, flushing with clean water or water with chemicals, and wiping off, or a combination of these processes.

[0052] By a further special embodiment, the at least one elongated tapering mandrel may be designed with rectangular cross-section, where each of the longitudinal edges of the mandrel are provided with a heating element, preferably an electric heating element. As the edges of the mandrel is the place where the tendency of deposition of fat residue is the greatest by repeated use of the apparatus for fur processing, it is expedient to ensure the best heating at these edges by disposing the heating elements here.

[0053] In a further variant, the at least one elongated tapering mandrel is adapted with a heat sensor sunk into the surface of the mandrel, preferably coupled to a thermostat and a control unit. Thus is achieved the option of regulating the temperature of the mandrel such that an optimal temperature range is attained.

[0054] By a particularly preferred variant of the invention, the at least one elongated tapering mandrel in the apparatus for fur processing may be designed with an automatic retainer device which is adapted with one or more means for retaining the head end of the fur at the thinnest end of the mandrel. The automatic retainer device has the advantage that without any great burden on the apparatus operator, a retention of the head end of the fur is performed, providing greater certainty that the

fur remains on the mandrel during the processing by the apparatus than by prior art techniques. For example, by the prior art where two pins at the thinnest end of the mandrel are put through the fur at the nose/eye area in order to provide retention against the fur being pushed to an unsuitable position on the mandrel during the treatment, which, however, requires high quality of the strength of the fur in the nose/eye area.

[0055] Such a retention device may furthermore be designed such that the automatic retention device includes:

at least one rod-shaped body with a central axis, at least one longitudinal hole in the mandrel, at least one actuator, at least one connection to a control unit in the apparatus and at least one clamping device, where the at least one

actuator is connected to a rod-shaped body and is connected to a control unit in the apparatus, the rod-shaped body being longitudinally displaceable in the at least one longitudinal hole in the mandrel, the shape of the longitudinal hole corresponding to the rod-shaped body,

where the at least one clamping device includes a surface section at the thinnest end of the mandrel and a retention member corresponding entirely or partly to the surface section, the retention member being connected to the said rod-shaped body, the retention member having an

active position and an inactive position, where the mandrel is ready for placing the fur on the mandrel at the inactive position of the retention member, where the retention member in the active position is disposed in contact with the head end of the fur, where this head end is

simultaneously provided on the surface section of the clamping device at the thinnest end of the mandrel. The disposition of the retention member in active and inactive positions, respectively, may thus be controlled via the control unit of the apparatus, which via the position of the

actuator and consequent position of the rod-shaped body may provide for achieving the positions of the retention member, depending on what is expedient at the given time in the treatment process.

[0056] Moreover, the at least one elongated tapering

mandrel in the apparatus for fur processing may be designed with an automatic extending device wherein a supplementing end part at the thinnest end of the at least one elongated tapering mandrel is provided with means for travelling from a start position to one or more extended

positions. The automatic extending device contributes to that the fur, after ending treatment in the apparatus, can be advanced to a position in the apparatus where a drawing device provides for removing the fur from the mandrel.

[0057] In a further embodiment, the retention member

may be embedded in a hollow on the mandrel in the inactive position. This provides the advantage that the retention member does not interfere when the fur is to be drawn on the mandrel.

[0058] In a further preferred embodiment, by embed-

ding in the said hollow the retention member can be provided with an extension in the surface of the mandrel substantially filling the extension of the hollow in the surface of the mandrel. Hereby is achieved that no dirt and

fat residue from the apparatus accumulate in the hollow. [0059] In a particularly preferred variant, the retention member can be an elongated body with a longitudinal slot having a slot centre axis which is substantially displaced in parallel in relation to the rod-shaped body, and where the retention member is pivotably attached to the rod-shaped body and where the retention member is longitudinally displaceable corresponding to the rod-shaped body, where a pivot is fastened to the mandrel in the hollow in the mandrel and close to the surface of the mandrel, where the pivot extends through the longitudinal slot in the retention member. Thereby is provided the possibility of extending and pivoting the retention member due to the offset position of the pivot relative to the point of rotation between the rod-shaped body and the retention member.

[0060] The retention member may thus be pivoted to the desired active position where the fur is retained by the retention member thereby. When thus the retention member is an elongated body, it provides an elongated contact surface against the head end of the fur where all furs introduced in the apparatus have good conditions for sufficient strength along the contact surface which is clamped in the clamping device between the retention member and a surface section of the thinnest end of the mandrel. This means that an apparatus with a retention device according to the invention puts more viable demands on the nature and strength of the fur at the head area. Thereby, scrapping of the otherwise fine furs only having a weakness at the head end of the fur is avoided.

Description of the Drawing

[0061]

- Fig. 1 shows a schematic setup of mandrel and scraper units in a possible combination; and
- Fig. 2 shows a scraper roller with centre part and replaceable scraper blades, as seen from the end;
- Fig. 3 is an elevation and a cross-section of the mandrel with embedded heating elements;
- Figs. 4a-c shows an automatic retention device at the thinnest end of the mandrel.

Detailed Description of the Invention

[0062] On Fig. 1 appears apparatus 1 for processing fur 2, preferably mink fur. The apparatus 1 here includes one elongated tapering mandrel 3 and three scraper units 4. The fur 2 is drawn with the fur side 5 facing inwards and the head end 6 of the fur 2 at the thinnest end 7 of the mandrel.

[0063] The fur 2 is scraped by the scraper units 4 as the apparatus 1 is adapted to bring the mandrel 3 and the scraper units 4 together, starting here with a roller scraper unit 8. The bringing together occurs in parallel

with the axis 9 of the mandrel 3. On Fig. 1 is seen that it is the mandrel 3, which is moved in a direction 10, which is axially parallel with the mandrel 3.

[0064] The roller scraper unit 8 is provided with two rotating primary scraper rollers 11 having a number of projecting scraper blades 12. The primary scraper rollers 11 are arranged at each their side of the mandrel 3 such as, while rotating in the shown directions of rotation 13, to transmit a tangential friction force 14 to the fur 2 on the mandrel 3 in a direction 14 towards the thickest end 15 of the mandrel 3. The shown secondary scraper rollers 16 are arranged at each their side of the mandrel 3 so as, while rotating in the shown directions of rotation 17, to transmit a tangential friction force 18 to the fur 2 on the mandrel 3 in a direction 18 towards the thinnest end 7 of the mandrel 3.

[0065] Each scraper roller 11, 16 is connected with each their pressure unit 19 intended for bringing the scraper roller 11, 16 into contact with the fur 2 at a programmably setable pressure.

[0066] During use of the apparatus 1, where a fur 2 is put on the mandrel 3, an optical unit 20 is moved from a detection of the thinnest end 7 of the mandrel in a direction 21 towards the thickest end 15 of the mandrel. When the optical unit 20 detects a recognisable material 22 mounted on the mandrel, the position of this measurement 23 is detected, and measurement data are entered in the control unit 24 of the apparatus 1.

[0067] The roller scraper unit 8 of the apparatus 1 is succeeded by two scraper units 4 in the form of two double after-scraping units 25, 26.

[0068] The first double after-scraping unit 25 contains a cleaning chamber 27 with suction or exhaust 28. The cleaning chamber 27 is located inside a U-shaped scraper blade 29. The U-shaped scraper blade 29 is provided with two cutting edges 30, 31 that are mutually offset. The two sets of cutting edges 30, 31 may be offset in relation to each other such that the openings 32, 33 between the cutting edges 30, 31 in the plane of each set of these have different cross-sections. Each of the U-shaped scraper blades 29 is connected with each their pressure unit 34 intended for bringing the cutting edges 30, 31 of the U-shaped scraper blade 29 in contact with the fur 2 at a programmably setable pressure.

[0069] The exhaust 28 is effected by means of a ventilator 35 or other pumping device 35 for producing a sub-pressure in a hose system 36 communicating with the cleaning chamber 27. Fat and flesh residues 37 caught by the exhaust are conducted to a collecting container 38 with the object of discarding.

[0070] The other double after-scraping unit 26 contains a cleaning chamber 27 as well with an exhaust 28. In the cleaning chamber 27 there are two rotating brushes 39 and two nozzles 40 for supplying liquid under pressure 41, where the pressure here is produced by a pump 42 and fed to the nozzles 40 via a hose system 43.

[0071] The suction 28 is effected by means of a pumping device 44 for producing a subpressure in a hose sys-

tem 45 communicating with the cleaning chamber 27. Fat and flesh residue 46 and liquid 41 from the nozzles 40 are caught by the exhaust 28 and conducted to a collecting container 47 for discarding.

[0072] On Fig. 2a is shown a scraper roller 11, 15 with eight replaceable scraper blades 48 and a centre part 49. In the centre part 49 there are provided eight cutouts 50 in which is disposed a scraper blade 48 with a cutting edge 51 facing away from the centre part 49. Moreover, in the cutouts 50 there is provided a retention device 52 which is fastened to the centre part 52, e.g. by a countersunk bolt assembly. The scraper blade 48 is a flat rectangular plate with cutting edge 51 at one edge but may also be designed reversible and with cutting edges 51 at both edges.

[0073] The scraper blade 48 is shown with a fluted surface 53 at one side of the scraper blade 48. The centre part 49 together with the retention devices 52 form a scraper blade cutout 54 which by design corresponds to the design of the scraper blade 48.

[0074] It is possible to have a centre part 48 for the scraper roller 11, 16 with a higher number of scraper blade cutouts 54 than required for use in all situations. This provides freedom of choice in the disposition and number of scraper blades 48 on the scraper rollers 11, 16.

[0075] Fig. 2b shows how the scraper blade cutouts 54 in the centre part 49 of the scraper roller 11, 16 can be designed as curving cutouts 55 such that a scraper blade 48 inserted in the curving cutout 55 will appear with an arch.

[0076] On Fig. 2c is shown the possibility of designing a scraper blade 48 as a flat rectangularly shaped plate, where the long side provided with cutting edge 51 is designed as an inwardly extending curve 56. Hereby is achieved the possibility of an optimised adaptation to the shape of the mandrel 3 used in the given fur processing apparatus 1. If making cutting edges 51 on both long sides, both cutting edges 51 can be made as an inwardly extending curve 56.

[0077] A further possibility is to let the reversible 48 scraper blade be designed as a triangular rod which is inserted in a corresponding cutout in the centre part of the scraper roller, and where all three longitudinal edges are with cutting edges.

[0078] On Fig. 3 is seen how heating elements 49 can be embedded in the surface of the mandrel 3 at the longitudinal edges 50 of the mandrel. A heat sensor 51 is sunk into the surface of the mandrel 3.

[0079] Figs. 4a-c show how a clamping device 52 can be provided at the thinnest end 7 of the mandrel 3. The clamping device 52 includes a surface section 53 at the thinnest end 7 of the mandrel 3. This surface section 53 may entirely or partly be a cutout in the mandrel 3 at its thinnest end 7. The clamping device 52 furthermore includes a retention member 54 connected with the rod-shaped body 55, which is provided longitudinally displaceable in the mandrel 3. The retention member has an active position which is shown on Fig. 4c and an in-

active position which is shown on Fig. 4a. By the inactive position, the retention member 54 is embedded in a hollow 56 in the mandrel 3, and by embedding in the said hollow 56, the retention member 54 has an extension 57 in the surface 58 of the mandrel that substantially fills the extension of the hollow 55 in the surface 58 of the mandrel.

[0080] The retention member 54 is an elongated body 59 with a longitudinal slot 60 having a slot centre axis 61 which in the inactive position is substantially displaced in parallel in relation to the centre axis 62 of the rod-shaped body 55, where the retention member 54 is pivotably attached to the rod-shaped body 55 and where the retention member is longitudinally displaceable 63 corresponding to the rod-shaped body 55, where a pivot 64 is fastened to the mandrel 3 in the hollow in the mandrel 3 and close to the surface 58 of the mandrel, where the pivot 64 extends through the longitudinal slot 60 in the retention member 54. Thereby is provided the possibility of extending and pivoting the retention member 54 due to the offset position of the pivot 64 relative to the point of rotation 65 between the rod-shaped body 55 and the retention member 54.

Claims

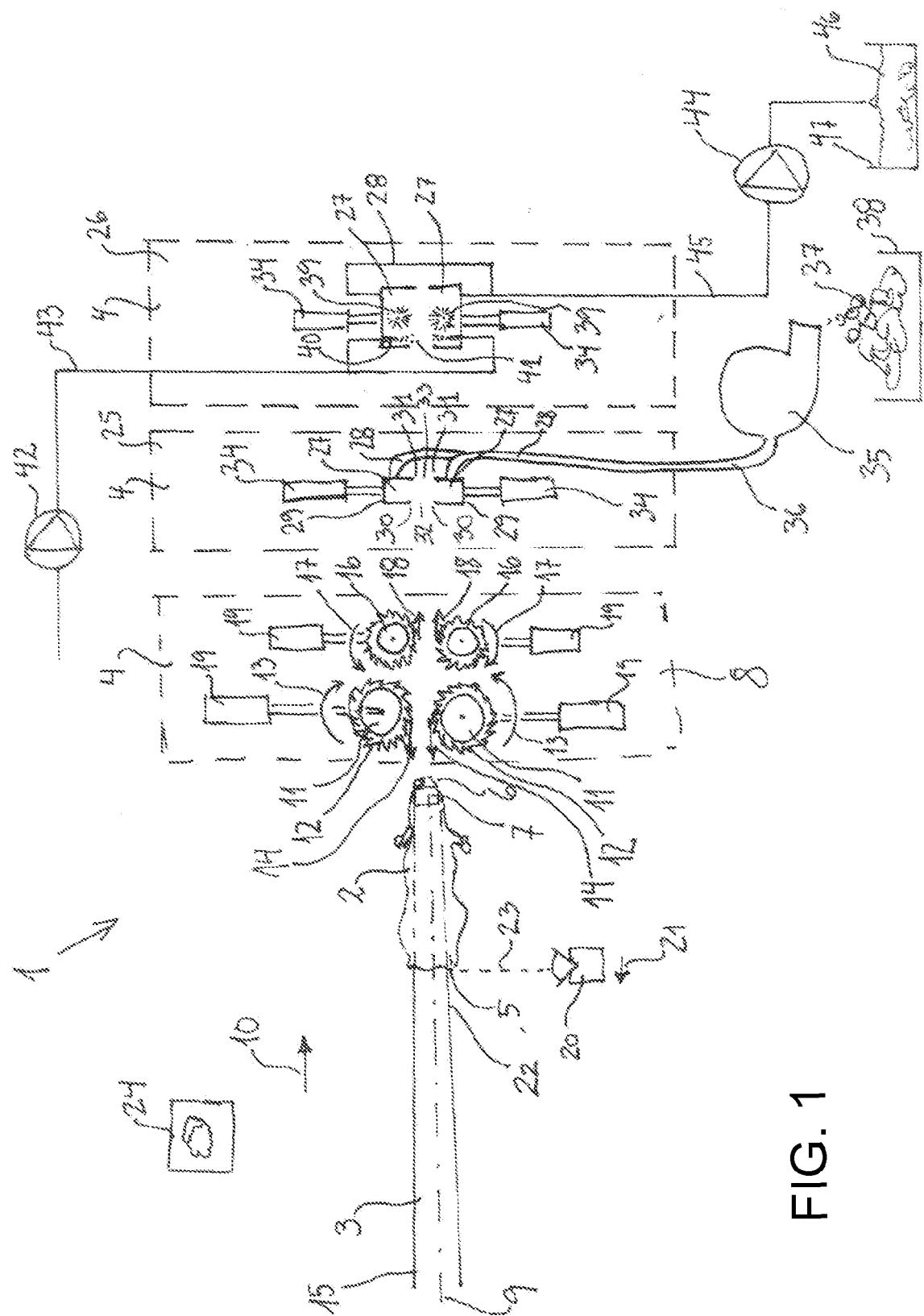
1. An apparatus for processing fur, preferably mink fur, where the apparatus includes at least one elongated tapering mandrel upon which the fur is drawn with the fur side facing inwards and with the head end of the fur at the thinnest end of the mandrel, where the fur is scraped by at least one scraper unit, where the apparatus is adapted to bring the mandrel and a roller scraper unit axially parallel together, and where the roller scraper unit is provided with at least two rotating primary scraper rollers having a number of projecting scraper blades, and where during rotation, the primary scraper roller is adapted to transmit a tangential friction force at each side of the mandrel to the fur on the mandrel in a direction towards the thickest end of the mandrel, **characterised in that** the roller scraper unit is furthermore adapted with at least one secondary scraper roller which during rotation is adapted to transmit a tangential friction force to the fur on the mandrel in a direction towards the thinnest end of the mandrel.
2. Apparatus for processing fur according to claim 1, **characterised in that** during rotation, the at least one secondary scraper roller is adapted to transmit a tangential friction force which is less than the tangential friction force from a primary scraper roller.
3. Apparatus for processing fur according to any of claims 1-2, **characterised in that** at least two primary scraper rollers are arranged for a first processing of the fur, and the at least one secondary scraper

roller is arranged for a subsequent processing of the fur.

4. Apparatus for processing fur according to any of claims 1-3, **characterised in that** the apparatus is adapted with a unit for automatic measurement of the extension of the fur on the mandrel. 5
5. Apparatus for processing fur according to any of claims 1-4, **characterised in that** the shaft of any scraper roller is connected with a pressing unit which is intended for bringing the scraper roller in contact with the fur by a programmably setable pressure as well as bringing the scraper roller out of contact with the fur, respectively, preferably based on data from the unit for automatic measurement of the extension of the fur and input data about the nature of the fur, such as race or sex of the animal. 10 15
6. Apparatus for processing fur according to any of claims 1-5, **characterised in that** the projecting scraper blades of at least one secondary scraper roller are replaceable. 20
7. Apparatus for processing fur according to claim 6, **characterised in that** the projecting scraper blades of the at least one secondary scraper roller are reversible. 25
8. Apparatus for processing fur according to any of claims 1-7, **characterised in that** the apparatus furthermore has at least one scraper unit in the form of a double after-scraping unit containing a cleaning chamber with suction, and where the cleaning chamber is arranged with a rotatable brush. 30 35
9. Apparatus for processing fur according to claim 8, **characterised in that** the cleaning chamber is arranged with a nozzle for supplying liquid under pressure. 40
10. Apparatus for processing fur according to any of claims 8-9, **characterised in that** every scraper unit on the apparatus is mounted on a hinged frame. 45

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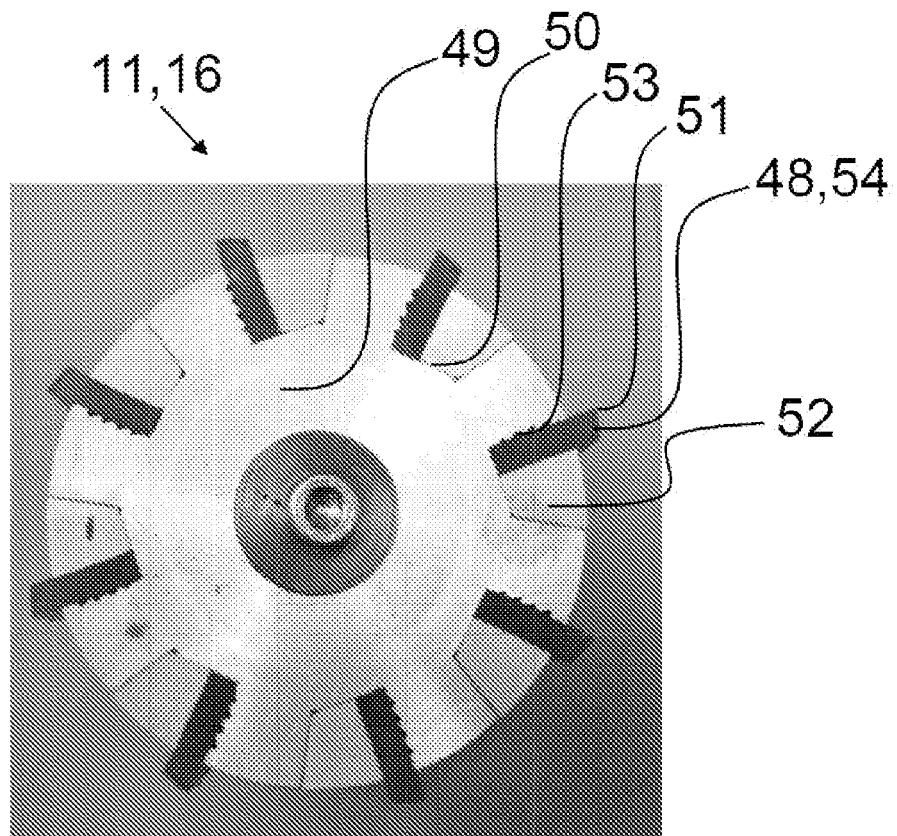


FIG. 2a

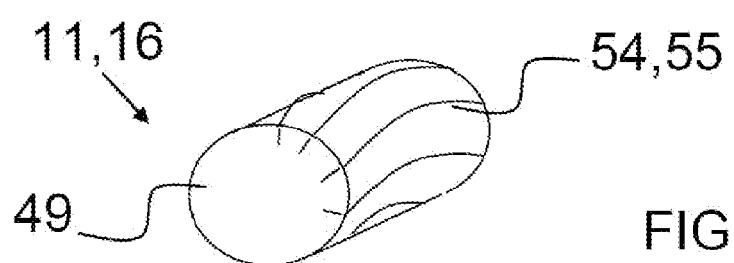


FIG. 2b

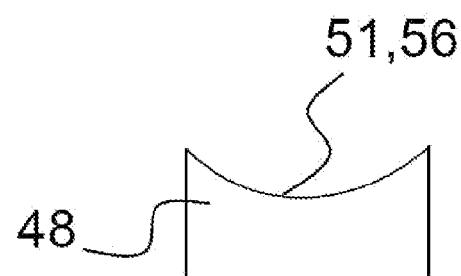


FIG. 2c

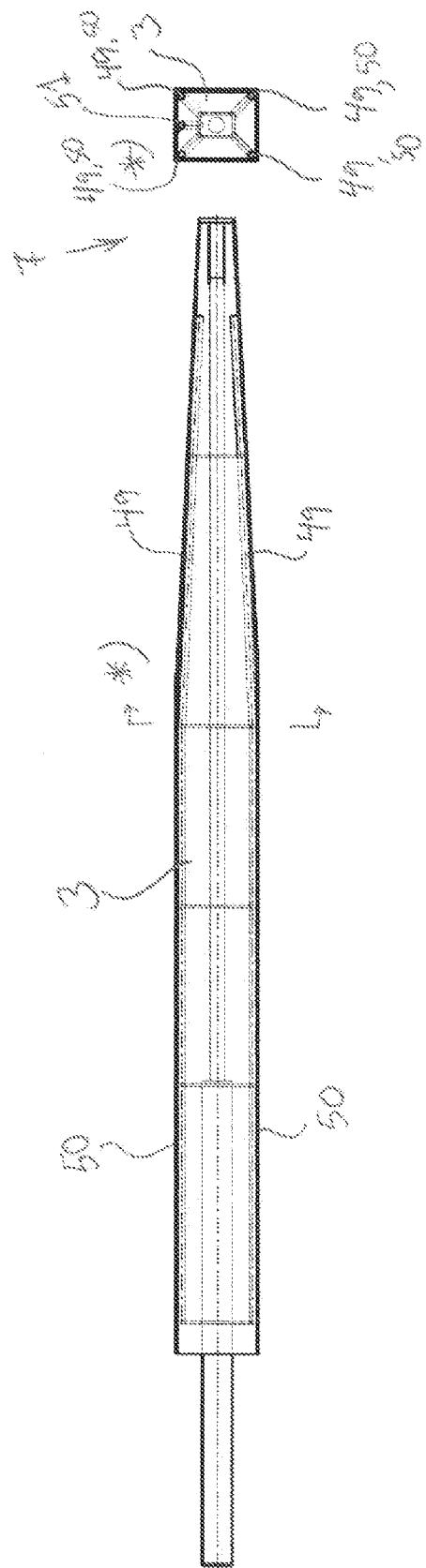


FIG. 3

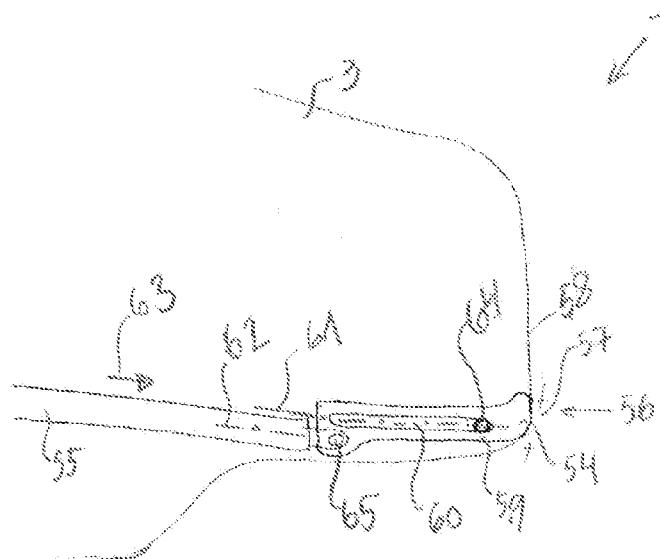


FIG. 4a

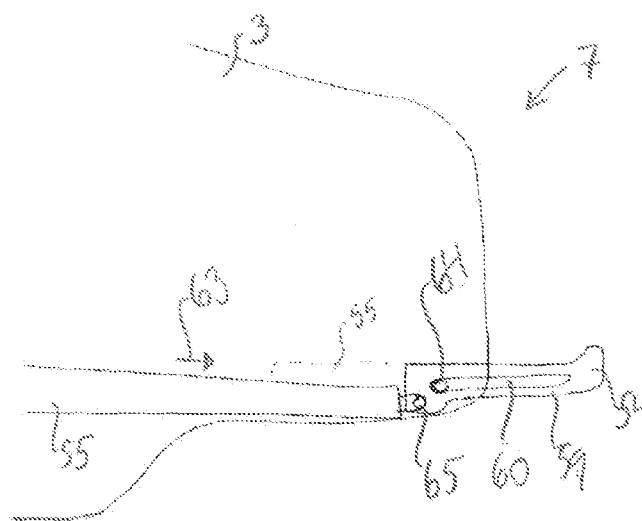


FIG. 4b

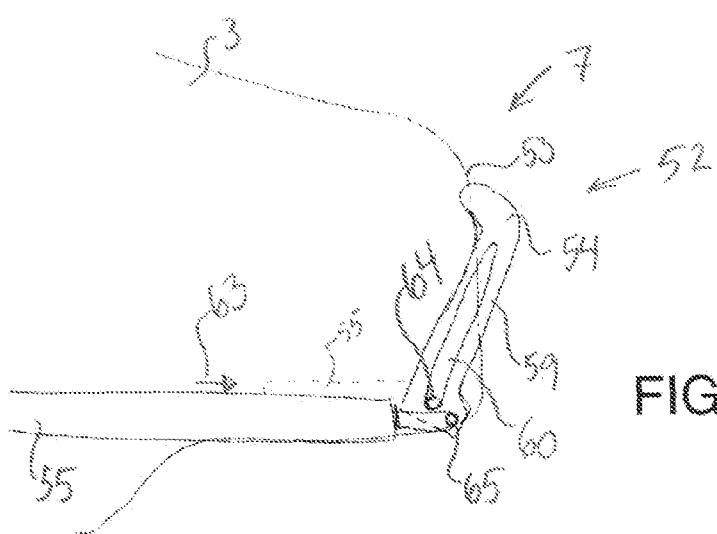


FIG. 4c



EUROPEAN SEARCH REPORT

Application Number
 EP 09 15 3313

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | CLASSIFICATION OF THE APPLICATION (IPC) |
|--|--|---|---|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | |
| A | US 4 745 782 A (LARSEN BENT J [DK]) 24 May 1988 (1988-05-24) * the whole document * ----- | 1 | INV. C14B1/10 C14B15/06 |
| | | | TECHNICAL FIELDS SEARCHED (IPC) |
| | | | C14B |
| 1 | The present search report has been drawn up for all claims | | |
| | Place of search | Date of completion of the search | Examiner |
| | Munich | 6 May 2009 | Helpiö, Tomi |
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EP 09 15 3313

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06-05-2009

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