

(19)



(11)

EP 3 091 091 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
09.11.2016 Bulletin 2016/45

(51) Int Cl.:
C14B 17/00 (2006.01) **C14B 17/02** (2006.01)
C14B 17/04 (2006.01)

(21) Application number: **15182538.7**

(22) Date of filing: **26.08.2015**

(84) Designated Contracting States:
AL 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 RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA

(71) Applicant: **Hedensted Gruppen A/S**
8722 Hedensted (DK)

(72) Inventors:
• **Madsen, Mr. Jens Jørgen**
5220 Odense SØ (DK)
• **Lange, Mr. Kent**
8763 Rask Mølle (DK)

(30) Priority: **07.05.2015 EP 15166750**

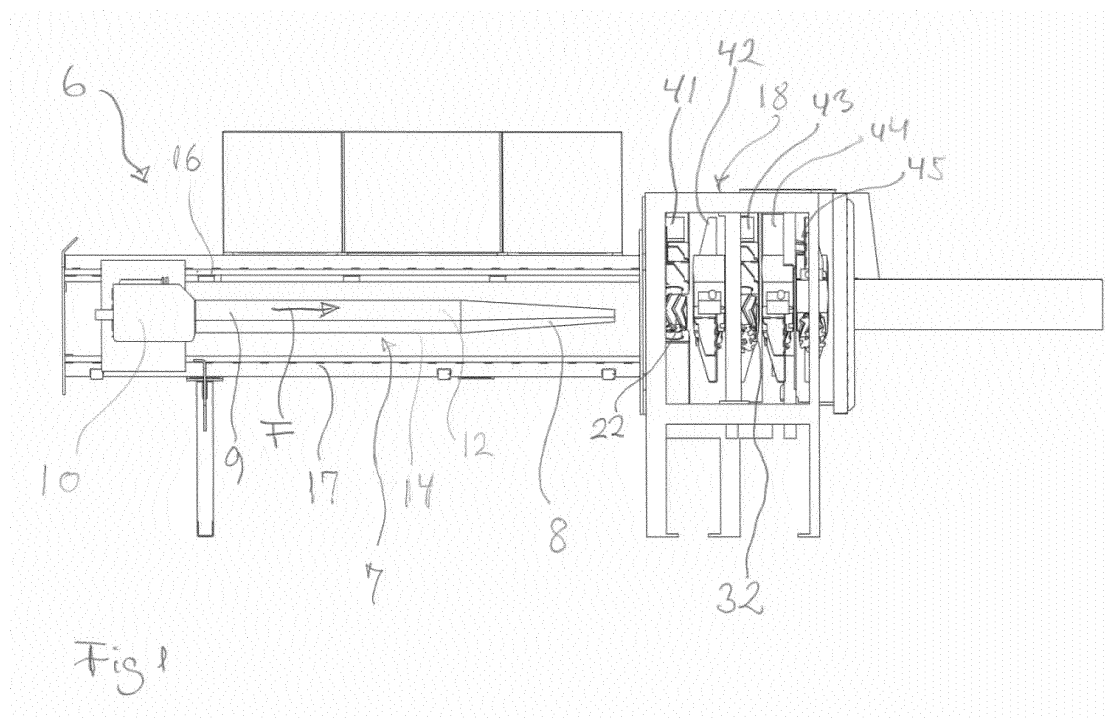
(74) Representative: **COPA Copenhagen Patents**
Rosenørns Allé 1, 2nd floor
1970 Frederiksberg C (DK)

(54) **AN APPARATUS WITH A PENTAGONAL MANDREL FOR PROCESSING PELTS**

(57) An apparatus for processing a tubular pelt comprises

- a mandrel (7) with a polygonal cross-section on which the tubular pelt can be mounted or drawn
- at least a primary scraping roller (22) arranged at each side face of the mandrel,
- a mandrel movable in relation to the scraping rollers in its longitudinal direction, wherein the mandrel (7) has a

cross-section as a convex, symmetrical pentagon, said first side of the pentagonal cross-section of the mandrel (7) defining a first side face of the mandrel, the pentagonal cross-section further comprising a second (12) and a third mutually diverging side and respectively defining a second and a third side face of the mandrel, and a fourth and a fifth side extending convergingly and fifth side face of the mandrel.



EP 3 091 091 A1

Description

FIELD OF THE INVENTION

[0001] The present invention relates to an apparatus for processing the flesh side of a tubular pelt, such as a mink pelt.

BACKGROUND OF THE INVENTION

[0002] It is well known to remove residues of fat and flesh from pelts by arranging the pelts on a mandrel with the flesh side facing outwards and bringing the flesh side of the pelts into contact with a rotating scraping roller with teeth scraping clean the flesh side of the pelt.

[0003] Apparatuses of the above type are known from e.g. Danish patents DK 177520 B1, DK 177365 B1, DK 177975 B1, DK 177954 B1, DK 156669 B3 as well as EP 2 093 299 A1 and WO 12019606.

[0004] When processing the flesh side of pelts, the aim is generally to exert a uniform and/or otherwise controlled scraping pressure on the entire flesh side surface of the pelt and to ensure a sufficiently effective scraping of said surface to clean it properly and at the same time ensure that the scraping is carried out as gently to the pelt so that it is not damaged. It is often a problem to obtain a sufficiently effective scraping of especially the front leg area of the pelt.

SUMMARY OF THE INVENTION

[0005] It is an object of the present invention to provide an apparatus for processing the flesh side of a pelt that can eliminate or reduce the problems of known apparatuses.

[0006] In order to obtain the above object, the present invention provides an apparatus comprising:

- a mandrel with a longitudinal direction and a polygonal cross-section, the mandrel preferably having a tapering shape with a first thin end being thinner than an opposite thick second end, and on which mandrel the tubular pelt can be mounted or drawn from the thin end of the mandrel with the fur side of the pelt facing inwardly towards the surface of the mandrel and the flesh side of the pelt facing outwardly,
- at least a primary scraping roller with a rotation axis being arranged at each side face of the mandrel and being, by means of a motor, rotatable about its rotation axis, each of said scraping rollers being configured, during operation of the apparatus, to be engageable with and scrape the flesh side portion of the pelt on the respective side face of the mandrel at which it is arranged, each scraping roller having two mutually spaced end faces and a roller surface extending between said end faces and comprising a number of scraping teeth being mutually spaced

along the circumference of the roller surface, and

- a drive for a linear movement of the mandrel in relation to the scraping rollers in the longitudinal direction of the mandrel,

wherein the mandrel has a cross-section as a convex, especially essentially symmetrical pentagon being symmetrical about a straight line between the middle point of a first side and the opposite vertex, said first side of the pentagonal cross-section of the mandrel defining a first side face of the mandrel, the first primary scraping roller being arranged at said side face, the pentagonal cross-section further comprising a second and a third mutually diverging side extending from opposite ends of the first side and respectively defining a second and a third side face of the mandrel, and a fourth and a fifth side extending convergingly from respective ends of the second and third sides of the pentagon to meet in the vertex opposite the first side of the pentagon and respectively defining the fourth and fifth side faces of the mandrel, the second and the third primary scraping roller being arranged respectively at the second and the third side face, and the fourth and the fifth primary scraping rollers being arranged respectively at the fourth and the fifth side face.

[0007] By means of a mandrel having a pentagonal cross-section, the mean length of each side is 20 % shorter than the mean length of each side of a rectangle having the same circumference. As a result, the scraping rollers engage and scrape a smaller circumferential length of the pelt than is possible with scraping rollers scraping a pelt on a mandrel having a rectangular cross-section. When scraping the pelt over a smaller circumferential length, an improved scraping result should be obtainable. Additionally, a mandrel with a pentagonal cross-section allows for designing the mandrel so that each front leg of the pelt is arranged adjacent or at a vertex to thereby obtain improved scraping of the areas at the legs, which generally are the most difficult areas to scrape properly. Further, when all the angles at the corners of the pentagon, i.e. all the angles between neighboring sides, are at an obtuse angle, the pelt is more easily pulled from one side to a neighboring side than in the case of a right angle or a rectangle. As a result an improved scraping is obtained of pelt portion at the areas of the corners of the mandrel.

[0008] In a preferred embodiment of the invention, the first side of the pentagonal cross-section of the mandrel is an upper essentially horizontal side defining a first upper essentially horizontal side face of the mandrel, the pentagonal cross-section further comprising a second and a third downwardly and outwardly, i.e. downwardly diverging, side extending from opposite ends of the first side and respectively defining a second and a third side face of the mandrel, and a fourth and a fifth side extending downwardly and inwardly, i.e. downwardly converging, from respective ends of the second and third sides of the

pentagon to meet in the vertex opposite the first side of the pentagon and respectively defining the fourth and fifth side faces of the mandrel.

[0009] Preferably, the tubular pelt is mounted or drawn unto the mandrel to arrange the back of the pelt on the first preferably upper side face of the mandrel so that the back and the tail of the pelt are arranged on a essentially horizontal face. It is hereby easy and convenient to draw the pelt onto the mandrel and to guide the tail into the correct position. It should, however, be noted that the first side of the pentagonal cross-section and thereby the first side face of the mandrel need not be arranged essentially horizontally.

[0010] According to an embodiment of the present invention, the mandrel has a cross-section as a regular pentagon, i.e. a pentagon where all sides are equal and all angles are equal.

[0011] According to a further embodiment according to the present invention, the mandrel has a cross-section as an irregular symmetrical pentagon.

[0012] This embodiment might be advantageous in the sense that it allows for an adaption of the length of the sides of the pentagon to the circumferential dimension of the pelt so that certain portions of the pelt are arranged at certain portions of the circumference of the mandrel. At present, it is considered an advantage to arrange the front legs of the pelt at or adjacent the corners of the mandrel between the second and fourth side faces and between the third and the fifth side faces of the mandrel. It is believed that an improved and more efficient scraping is thereby obtainable of the said areas. The tapering of the mandrel is therefore advantageously chosen such than both the front legs of small female pelts and the front legs of large male pelts are arranged at or adjacent the corners of the mandrel between the second and the fourth side faces and the between the third and the fifth side faces.

[0013] The first side can be shorter than the fourth and the fifth sides of the pentagon, such as 5 to 30% shorter.

[0014] The second and third sides can be shorter than the fourth and fifth sides of the pentagon, such as 5 to 30 % shorter.

[0015] The first, second and third sides of the pentagon can have essentially the same lengths.

[0016] Both the first side and the second and third sides of the pentagon can be shorter than the fourth and the fifth sides of the pentagon. However, at present, it is preferred that the first side is longer than the fourth and the fifth sides of the pentagon, such as 3 to 30 %, alternatively 5-20% longer, and the second and third sides are preferably also longer than the forth and the fifth sides of the pentagon, such as 3 to 30 %, alternatively 5 to 20 % longer.

[0017] As indicated above, the width of the first, second, third side faces of the mandrel can advantageously be set so that the front legs of the pelt are arranged at or adjacent the vertex between the second and fourth sides and the vertex between the third and fifth sides, respec-

tively.

[0018] In a further embodiment of the present invention, an additional first scraping roller is arranged at the first preferably upper side face of the mandrel and is configured, during operation of the apparatus, to be engageable with and scrape the flesh side portion of the pelt superjacent the upper side face of the mandrel.

[0019] In this embodiment, the portion of the flesh side of the skin arranged superjacent to the first side face will be scraped first by the primary scraping roller and thereafter by the additional scraping roller. This is advantageous especially when the back of the pelt is arranged superjacent the first side face of the mandrel as the back of the pelt may be difficult to scrape properly with a single scraping roller.

[0020] In a further embodiment of the present invention, an additional second and third scraping roller is arranged respectively at the second and third preferably downwardly diverging side faces of the mandrel and configured, during operation of the apparatus, to be engageable with and scrape the flesh side portion of the pelt superjacent the respective side faces of the mandrel.

[0021] As a result, the pelt portions arranged superjacent to the mentioned side faces of the mandrel are first scraped by primary scraping rollers and thereafter by the additional scraping rollers, whereby the scraping and cleaning of the flesh side of the pelt are improved. This is advantageous as the front legs of the pelt can be arranged superjacent the said side faces of the mandrel.

[0022] According to an additional embodiment of the present invention, an additional fourth and fifth scraping roller is arranged respectively at the fourth and fifth preferably downwardly converging side faces of the mandrel and configured, during operation of the apparatus, to be engageable with and scrape the flesh side portion of the pelt superjacent the respective side faces of the mandrel.

[0023] The additional fourth and fifth scraping rollers allow for an additional scraping of the portion of the flesh side of the pelt superjacent the fourth and fifth side faces of the mandrel after said side faces have been scraped by the primary scraping rollers. This is considered advantageous if the legs of the pelt are arranged at the mentioned side faces of the mandrel.

[0024] In general, an optimal scraping result is obtainable by scraping all pelt portions by means of both a primary scraping roller and thereafter by means an additional scraping roller.

[0025] In a preferred embodiment of the present invention, the primary scraping rollers are arranged, during engagement with and scraping of the flesh side of the pelt, to rotate in the direction from the thin end towards the thick end of the mandrel, i.e. in the opposite direction of the longitudinal forward direction of the mandrel during scraping of the fur.

[0026] An additional scraping roller can be arranged at each of the second and third side faces of the mandrel, each scraping being configured to rotate in the opposite direction of the primary scraping rollers.

[0027] Further, an additional scraping roller can be arranged at each of the fourth and fifth side faces of the mandrel and be configured to rotate in the opposite direction of the primary scraping rollers.

[0028] In a further preferred embodiment of the present invention, the additional scraping rollers are arranged, during engagement with and scraping of the flesh side of the pelt, to rotate in the direction from the thin end towards the thick end of the mandrel, i.e. in the opposite direction of the longitudinal forward direction of the mandrel during scraping of the fur.

[0029] A primary scraping roller can be arranged at each of the second and third side faces of the mandrel and be configured to rotate in the opposite direction of the additional scraping rollers.

[0030] Further, a primary scraping roller can be arranged at each of the fourth and fifth side faces of the mandrel and be configured to rotate in the opposite direction of the additional scraping rollers.

[0031] Both the primary scraping rollers and the additional scraping rollers can be of any type of scraping rollers and can be combined in any way considered advantageous or useful. Thus, the scraping rollers can be of the known types: scraping rollers with helix-shaped teeth, scraper rollers with V-shaped teeth and scraping rollers with straight teeth, or any other type of scraping rollers.

[0032] By the term "scraping roller with helix-shaped teeth" or "helix scraping roller" or "helix roller" is to be understood a scraping roller where the teeth of the roller are arranged so that the starting and ending points of each tooth at the end faces of the roller are displaced from each other i.e. are positioned at different angle positions on the circumference of the roller in such a way that the teeth extend essentially helically along the roller surface, whereby the scraping roller exerts a force component on the pelt on the mandrel transversal to the longitudinal direction of the mandrel.

[0033] By the term "scraping roller with V-shaped teeth" or "V-scraping roller" or "V-roller" is to be understood a scraping roller where the teeth essentially follow a V-shape between the end faces of the scraping roller. The vertex of the teeth can face in the same direction as the rotation direction of the roller, whereby the pelt is forced towards the edges of the mandrel side face in question or faces in the opposite direction of the rotation direction of the roller, whereby the pelt on the respective side face of the mandrel is drawn towards the middle of said side face, the latter arrangement being the most common.

[0034] By the term "scraping roller with straight teeth" or "straight scraping roller" or "straight roller" is to be understood a scraping roller with teeth extending essentially linear between the end faces of the roller, the end point of each tooth being at the end faces of the roller positioned essentially at the same angular position of the circumference of the roller.

[0035] According to a preferred embodiment of the present invention, the primary scraping roller and option-

ally an additional scraping roller at the first side face of the mandrel is a scraping roller having V-shaped teeth, the vertex of the V-shaped teeth preferably facing opposite the direction of rotation of scraping roller(s).

[0036] The primary scraping roller at the second and third side faces of the mandrel can on each of said faces be a V-roller or a helix roller pulling/forcing the pelt in the same direction transversely of the longitudinal direction of the mandrel, or a V-roller on the second side face and a helix roller on the third side face of the mandrel.

[0037] According to an at present preferred embodiment of the invention, the primary scraping roller at the second and third side faces of the mandrel is on each of said faces a helix roller pulling/forcing the pelt in the same direction transversely of the longitudinal direction of the mandrel, the direction being preferably away from the first side face of the mandrel, i.e. downwardly from the first side face.

[0038] The apparatus can comprise an additional scraping roller at the second and third side faces, the additional scraping roller being on each of said faces a V-roller or a helix roller optionally pulling/forcing the pelt in the opposite direction transversely of the longitudinal direction of the mandrel than the primary helix rollers, on each of said side faces, or a V-roller on the second side face and a helix roller on the third side face optionally pulling the pelt in a transverse direction opposite to that of a primary helix roller at the third side face.

[0039] As an example, the apparatus can be provided with the following scraping rollers at the second and third side faces of the mandrel:

- A primary V-roller or a primary helix roller at each of the second and third side faces of the mandrel and an additional V-roller or an additional helix roller at each of the second and third side faces of the mandrel, or
- A primary V-roller on the second side face and a primary helix roller on the third side face of the mandrel and an additional V-roller on the second side face and an additional helix roller on the third side face of the mandrel. Optionally, the additional helix roller at the third side face subjects the pelt to a transverse force component in the direction opposite to that of a primary helix roller on the third side face of the mandrel.

[0040] According to an at present preferred embodiment of the present invention, the apparatus comprising an additional scraping roller at the second and third side faces, the additional scraping roller being on each of said faces a helix roller preferably pulling/forcing the pelt in the opposite direction transversely of the longitudinal direction of the mandrel than the primary helix rollers on each of said side faces, the direction being preferably towards the first side face of the mandrel, i.e. upwardly towards the first side face.

[0041] The primary scraping roller at the fourth and fifth side faces can on each of said faces be a V-roller or a helix roller pulling/forcing the pelt in the same direction transversely of the longitudinal direction of the mandrel, the direction being optionally opposite to the direction that primary helix rollers on the second and third faces are pulling the pelt, or a V-roller on the fourth face and a helix roller on the fifth face.

[0042] According to an at present preferred embodiment of the present invention, the primary scraping roller at the fourth and fifth side faces is on each of said faces a helix roller, the primary scraping roller on the fifth side face being a helix roller pulling/forcing the pelt in a direction transversely of the longitudinal direction of the mandrel, the direction being preferably towards the first side face of the mandrel, and the primary scraping roller at the fourth side face of the mandrel being a helix roller pulling/forcing the pelt in a direction transversely of the longitudinal direction of the mandrel, said direction being towards or away from the first side face of the mandrel, i.e. upwardly towards or downwardly away from the first upper side face

[0043] The apparatus can comprise an additional scraping roller at the fourth and fifth side faces, the additional scraping roller being on each of said faces a V-roller or a helix roller optionally pulling/forcing the pelt in the opposite direction transversely of the longitudinal direction of the mandrel than the primary helix rollers on each of said side faces, or a V-roller on the fourth face and a helix roller on the fifth face optionally pulling the pelt in a transverse direction opposite to that of a primary spiral roller at the fifth face.

[0044] As an example, the apparatus can be provided with the following scraping rollers at the fourth and fifth side face of the mandrel:

- A primary V-roller or a primary helix roller at each of the fourth and fifth side faces of the mandrel and an additional V-roller or an additional helix roller at each of the fourth and fifth side faces of the mandrel, or
- A primary V-roller on the fourth side face and a primary helix roller on the fifth side face of the mandrel and an additional V-roller on the fourth side face and an additional helix roller on the fifth side face of the mandrel. Optionally, the additional helix roller at the fifth side face subjects the pelt to a transverse force component in the direction opposite to that of a primary helix roller on the fifth side face of the mandrel.

[0045] According to an at present preferred embodiment of the invention, said apparatus comprises an additional scraping roller at the fourth and fifth side faces, the additional scraping roller being on each of said faces a helix roller, the additional scraping roller at the fourth side face pulling/forcing the pelt in a direction transversely of the longitudinal direction of the mandrel, preferably in a direction opposite to that of the primary scraping

roller at the fourth side face, and the additional scraping roller on the fifth side face pulling/forcing the pelt in a direction transversely of the longitudinal direction of the mandrel, the direction being in the opposite or the same direction as the primary scraping roller at the fifth side face.

[0046] According to an additional embodiment, the scraping rollers of the apparatus are arranged in a scraping roller housing comprising, as seen in the forward movement direction F of the mandrel into the housing, the following consecutive sections:

- a first section comprising the second primary scraping roller at the second side face of the mandrel and the third primary scraping roller at the third side face of the mandrel, both the first and the second primary scraping roller being a helix roller pulling/forcing the pelt in a direction transversely of the longitudinal direction of the mandrel, the direction being towards the first or upper side face of the mandrel, and
- a second section comprising a first primary scraping roller being a V-roller arranged at the first or upper side face of the mandrel and an additional primary scraping roller, such as a fourth primary scraping roller arranged at the fourth side face, and being a helix roller pulling/forcing the pelt in a direction transversely of the longitudinal direction of the mandrel, the direction being towards or away from the first or upper side face of the mandrel.

[0047] According to a further embodiment, the scraping roller housing comprises a third section arranged consecutive to the second section and comprising a fifth primary scraping roller arranged at the fifth side face of the mandrel and an additional scraping roller such as a second additional scraping roller arranged at the second side face, the fifth primary scraping roller and the second additional scraping roller being a helix roller pulling/forcing the pelt in a direction transversely of the longitudinal direction of the mandrel, the direction being towards the first or upper side face of the mandrel.

[0048] According to an additional embodiment, the scraping roller housing comprises a fourth section arranged consecutive to the third section and comprising a third additional scraping roller arranged at the third side face and an additional scraping roller such as a fourth additional scraping roller arranged at the fourth side face of the mandrel, both said third and fourth additional scraping rollers being a helix roller pulling/forcing the pelt in a direction transversely of the longitudinal direction of the mandrel, said direction of the third additional scraping roller being upwardly towards the first or upper side surface of the mandrel, and the direction of the fourth additional scraping roller being upwardly towards or downwardly away from the first or upper side face of the mandrel, and preferably opposite to that of the fourth primary scraping roller on the fourth side face of the mandrel,

such as upwardly towards the first or upper side face of the mandrel.

[0049] Finally according to an embodiment the scraping roller housing comprises a fifth section arranged consecutive to the fourth section and comprising a first additional scraper roller being a V-roller and an additional scraper roller such as a fifth additional scraper roller being a helix roller pulling/forcing the pelt in a direction transversely of the longitudinal direction of the mandrel, said direction of the fifth additional scraping roller being upwardly towards or downwardly away from the first or upper side surface of the mandrel.

BRIEF DESCRIPTION OF THE FIGURES

[0050] 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 are not to be construed as being limiting to other possible embodiments falling within the scope of the attached claim set.

Fig. 1 is a lateral view of an apparatus according to the invention,

Fig. 2 is a plane view of the apparatus shown in Fig. 1

Fig. 3 is a diagrammatical perspective view of a part of the apparatus shown in Fig. 1 and discloses a mandrel and scraping rollers driven by motors as seen from a first thin end of the mandrel towards a second thick end of the mandrel, the spacing between the scraping rollers being increased in order to show the scraping rollers and motors more clearly,

Fig. 4 is a view corresponding to that in Fig. 3 where the motors have been deleted and the spacing between the scraping rollers has been increased in order to show the scraping rollers more clearly,

Fig. 5 is a view corresponding to that of Fig. 3 seen from the second thick end of the mandrel towards the first thin end of the mandrel, the spacing between the scraping rollers and motors being increased,

Fig. 6 is a view corresponding to that of Fig. 5 with the motors deleted and the spacing between the scraping rollers increased,

Fig. 7 is a view of the mandrel with a pelt mounted thereon, i.e. drawn on the mandrel from the first thin end thereof,

Fig. 8 shows a cross-section of a mandrel having a cross-section of a regular pentagon,

Fig. 9 shows a cross-section of a mandrel having a cross-section as a convex irregular but symmetrical

pentagon,

Fig. 10 shows a cross-section of an at present preferred mandrel having a cross-section as a convex irregular but symmetrical pentagon,

Fig. 11 is a diagrammatical perspective illustration corresponding essentially to that of Fig. 5 of an at present preferred arrangement of scraping rollers for scraping a pelt arranged on the mandrel, and

Fig. 12 shows by means of arrows the direction in which the scraping rollers at the side faces of the mandrel are pulling/forcing when being in engagement therewith when scraping the pelt.

DETAILED DESCRIPTION OF THE INVENTION

[0051] Figs. 1 and 2 show an apparatus 6 according to the invention for processing, i.e. scraping, the flesh side of a tubular pelt, especially a mink pelt. The apparatus comprises an elongated tapering mandrel 7 having a first thin end 8 and an opposite second thick end 9. At the second thick end 9, the mandrel 7 is fixed to a carriage 10. The carriage is guided along horizontal guide rails 16, 17 for moving the mandrel towards and into a scraping roller housing 18 in the longitudinal direction of the mandrel. The scraping roller housing 18 houses scraping rollers for scraping the pelt.

[0052] The carriage and thereby the mandrel are moved by a drive not shown. In the scraping roller housing 18, a pelt 19 is scraped on the flesh side 20 thereof as the pelt is drawn onto the mandrel from the thin end thereof with the flesh side 20 facing outwards as shown in Fig. 7. The apparatus 6 further comprises a control unit 29 for controlling e.g. the movement of the mandrel 7 into the housing and out of the housing 18 after the pelt has been scraped and for controlling the rotation of the scraping rollers and their motion into contact with the pelt arranged on the mandrel.

[0053] As shown in Figs. 8 and 9 and 10, the mandrel 7 has a pentagonal cross-section comprising a first side 1, second 2 and third 3 mutually diverging sides extending from opposite ends of the first side 1, and a fourth 4 and a fifth 5 side extending convergingly from the respective ends of the second and third sides of the pentagon to meet in a vertex 26 opposite the first side 1. In the embodiment shown, the first side 1 is an upper horizontal side defining an upper horizontal side face 11 of the mandrel, the second side 2 and the third side 3 extend downwardly and outwardly and define a second side face 12 and a third side face 13 respectively of the mandrel, and the fourth side 4 and the fifth side 5 extend downwardly and inwardly and define a fourth side face 14 and a fifth side face 15 of the mandrel 7.

[0054] The pentagon shown in Fig. 8 is a regular pentagon, i.e. a pentagon where all sides are equal and all angles are equal, whereas the pentagon shown in Fig. 9

is a convex irregular symmetrical pentagon being symmetrical about a symmetry line from the middle point of the first side 1 to the vertex 26. In the pentagon shown in Fig. 9, the first and the second and the third sides are shorter than the fourth and fifth sides. The at present preferred pentagon is shown in Fig. 10. The preferred pentagon is a convex irregular symmetrical pentagon being symmetrical about a symmetry line from the middle point of the first side 1 to the vertex 26. In the preferred pentagon shown in Fig. 10, the first and the second and the third sides are longer than the fourth and fifth sides.

[0055] Reference is now made to Figs. 1 and 2 and especially Figs. 3-6 and additionally to Fig. 11 disclosing the scraping rollers arranged in the scraping roller housing and how the scraping rollers are arranged relative to the mandrel 7 when the mandrel is moved into the scraping roller housing 18 and the scraping rollers are in contact with a pelt arranged on the mandrel.

[0056] As seen in the forward movement direction F of the mandrel 7 into the scraping roller housing 18, the following scraper rollers are housed in the scraper roller housing 18:

In a first section 41 of the housing 18:

- a second primary scraper roller 22 driven by a motor 30 and arranged at the second side face 12 of the mandrel 7 in order to contact and scrape the pelt portion superjacent said side face, and
- a third primary scraping roller 23 driven by a motor and arranged at the third side face 13 of the mandrel 7 in order to contact and scrape the pelt portion superjacent said side face,

In a second section 42 of the housing 18:

- a first primary scraper roller 21 driven by a motor 30 and arranged at the first side face 11 of the mandrel 7 in order to contact and scrape the pelt portion superjacent said side face, and
- a fourth primary scraping roller 24 driven by a motor 30 and arranged at the fourth side face 14 of the mandrel 7 in order to contact and scrape the pelt portion superjacent said side face,

In a third section 43 of the housing 18:

- a fifth primary scraper roller 25 driven by a motor 30 and arranged at the fifth side face 15 of the mandrel 7 in order to contact and scrape the pelt portion superjacent said side face, and
- a second secondary or additional scraper roller 32 driven by a motor 30 and arranged at the second side face 12 of the mandrel 7 in order to contact and scrape the pelt portion superjacent said side face after the said pelt portion has been

scraped by the second primary scraping roller 22.

In a fourth section 44 of the housing 18:

- a fourth secondary or additional scraper roller 34 driven by a motor 30 and arranged at the fourth side face 14 of the mandrel 7 in order to contact and scrape the pelt portion superjacent said side face after the said pelt portion has been scraped by the fourth primary scraping roller 24, and
- a third secondary or additional scraper roller 33 driven by a motor 30 and arranged at the third side face 13 of the mandrel 7 in order to contact and scrape the pelt portion superjacent said side face after the said pelt portion has been scraped by the third primary scraping roller 23,

In a fifth section 45 of the housing 18:

- a first secondary or additional scraper roller 31 driven by a motor 30 and arranged at the first side face 11 of the mandrel 7 in order to contact and scrape the pelt portion superjacent said side face after the said pelt portion has been scraped by the first primary scraping roller 21, and
- a fifth secondary or additional scraper roller 35 driven by a motor 30 and arranged at the fifth side face 15 of the mandrel 7 in order to contact and scrape the pelt portion superjacent said side face after the said pelt portion has been scraped by the fifth primary scraping roller 25.

[0057] In the embodiment shown, both primary scraping rollers and secondary scraping rollers are arranged at all the side faces of the mandrel so that essentially all portions of the pelt are scraped by both a primary and a secondary scraping roller. It should, however, be noted that in accordance with the present invention, it is also possible to arrange a secondary or additional scraping roller at one, two, three, four or all the side faces of the mandrel.

[0058] As shown in Fig. 7, the pelt 19 is drawn onto the mandrel so that the back and the tail 30 of the pelt 19 are arranged on the upper side face 11. However, the back of the pelt can be arranged on any side face of the mandrel.

[0059] Further, as shown in Fig. 7, the mandrel 7 is dimensioned in such a manner relative to the pelt that the front legs of the pelt are arranged at or adjacent the corners between the second and fourth side faces 12, 14 and the third and the fifth side faces, only one leg 46 and one corner 48 being shown in Fig. 7. By arranging the front legs at corners of the mandrel, it is expected that an improved scraping is obtainable of the front leg areas, said areas being generally the most difficult portions of the pelt to scrape properly.

[0060] Further, in the embodiment shown in Figs. 1 to 6, all scraping rollers, both the primary scraping rollers and the secondary or additional scraping rollers, are shown as V-rollers rotating in a direction from the first thin end 8 of the mandrel 7 towards the second thick end 9 thereof, i.e. in a direction opposite the forward movement direction of the mandrel 7. The rotation direction of the scraping rollers is shown by arrows on the end face of the rollers. It should, however, be noted that the scraping rollers can be any type of scraping rollers and combinations of different types of scraping rollers. Thus, some or all of the scraping rollers can be helix rollers as shown in Fig. 11. Additionally, some of the scraping rollers can rotate in the opposite direction, if desired.

[0061] By way of example, the combination of rollers could be as follows:

In the first housing section 41:

- the second primary roller 22 at the second side face 12 is a V-roller, and
- the third primary roller 23 at the third side face 13 is a helix roller subjecting the pelt to a force component transversely of the mandrel.

In the second housing section 42:

- the first primary roller 21 at the first side face 11 is a V-roller, and
- the fourth primary roller 24 at the fourth side face 14 is a V-roller.

In the third housing section 43:

- the fifth primary roller 25 at the fifth side face 15 is a helix roller subjecting the pelt to a force component transversely of the mandrel, and
- the second secondary or additional scraper roller 32 at the second side face 12 is a V-roller.

In the fourth housing section 44:

- the fourth secondary or additional scraper roller 34 at the fourth side face 14 is a V-roller, and
- the third secondary or additional scraper roller 33 at the third side face 13 is a helix roller subjecting the pelt on the mandrel to a force component transversely of the mandrel, the force component being preferably in the direction opposite to that of the primary roller 23 on the same side face.

In a fifth housing section 45:

- the first secondary or additional scraper roller 31 at the first side face 11 is a V-roller, and
- the fifth secondary or additional scraper roller 35 at the fifth side face 15 is a helix roller sub-

jecting the pelt on the mandrel to a force component transversely of the mandrel, the force component being preferably in the direction opposite to that of the primary roller 25 on the same side face.

[0062] The above example is only one of a number of possible combinations of scraper rollers.

[0063] By way of a further example disclosing the, at present, preferred combination, the combination of the rollers is as follows:

In the first housing section 41:

- the second primary roller 22 at the second side face 12 is a helix roller subjecting the pelt to a force component, i.e. pulling/forcing the pelt in a direction transversely of the mandrel, the direction being downwardly relative to the upper side face 11 of the mandrel, and
- the third primary roller 23 at the third side face 13 is a helix roller subjecting the pelt to a force component i.e. pulling /forcing the pelt in a direction transversely of the mandrel, the direction being also downwardly away from the upper side face of the mandrel.

In the second housing section 42:

- the first primary roller 21 at the first side face 11 is a V-roller, and
- the fourth primary roller 24 at the fourth side face 14 is a helix roller, subjecting the pelt to a force component i.e. pulling/forcing the pelt in a direction transversely of the mandrel, the direction being downwardly away from the upper side face of the mandrel. However the direction could also be upwardly towards the upper side face 11 of the mandrel.

In the third housing section 43:

- the fifth primary roller 25 at the fifth side face 15 is a helix roller subjecting the pelt to a force component in a direction transversely of the mandrel, the direction being upwardly towards the upper side face of the mandrel, and
- the second secondary or additional scraper roller 32 at the second side face 12 is a helix roller subjecting the pelt to a force component i.e. pulling/forcing the pelt in a direction transversely of the mandrel, the direction being also upwardly towards the upper side face of the mandrel.

In the fourth housing section 44:

- the fourth secondary or additional scraper roller 34 at the fourth side face 14 is a helix roller sub-

- jecting the pelt to a force component in a direction transversely of the mandrel, the direction being upwardly towards the upper side face of the mandrel. However, the direction could also be downwardly away from the upper side face of the mandrel, and
- the third secondary or additional scraper roller 33 at the third side face 13 is a helix roller subjecting the pelt on the mandrel to a force component in a direction transversely of the mandrel, the direction of the force component being also in the direction upwardly towards the upper side face of the mandrel,

In a fifth housing section 45:

- the first secondary or additional scraper roller 31 at the first side face 11 is a V-roller, and
- the fifth secondary or additional scraper roller 35 at the fifth side face 15 is a helix roller subjecting the pelt on the mandrel to a force component in a direction transversely of the mandrel, the direction of the force component is downwardly away from the upper side face of the mandrel. However the force component could also be in the opposite direction, i.e. upwardly towards the upper side face of the mandrel.

[0064] Finally, it should be noted that other combinations of the rollers are possible and that the order of the primary and secondary scraping rollers shown in the embodiments is only to be considered as examples, and the order can be changed as desired.

LIST OF REFERENCE NUMERALS

[0065]

- | | | |
|----|-------------------------|--|
| 1 | first side | |
| 2 | second side | |
| 3 | third side | |
| 4 | fourth side | |
| 5 | fifth side | |
| 6 | apparatus | |
| 7 | mandrel | |
| 8 | first thin end | |
| 9 | second thick end | |
| 10 | carriage | |
| 11 | first side face | |
| 12 | second side face | |
| 13 | third side face | |
| 14 | fourth side face | |
| 15 | fifth side face | |
| 16 | guide rail | |
| 17 | guide rail | |
| 18 | scraping roller housing | |
| 19 | pelt | |
| 20 | flesh side | |

- | | | |
|-------|---------------------------------------|--|
| 21 | first primary roller | |
| 22 | second primary roller | |
| 23 | third primary roller | |
| 24 | fourth primary roller | |
| 5 25 | fifth primary roller | |
| 26 | vertex | |
| 27 | corner | |
| 28 | corner | |
| 29 | control unit | |
| 10 30 | tail | |
| 31 | first secondary or additional roller | |
| 32 | second secondary or additional roller | |
| 33 | third secondary or additional roller | |
| 34 | fourth secondary or additional roller | |
| 15 35 | fifth secondary or additional roller | |
| 41 | first section of roller housing | |
| 42 | second section of roller housing | |
| 43 | third section of roller housing | |
| 44 | fourth section of roller housing | |
| 20 45 | fifth section of roller housing | |
| S | symmetry line | |
| F | forward movement | |

25 Claims

1. An apparatus (6) for processing the flesh side (20) of a tubular pelt, such as a mink pelt, said apparatus comprising:

- a mandrel (7) with a longitudinal direction and a polygonal cross-section, the mandrel preferably having a tapering shape with a first thin end (8) being thinner than an opposite thick second end (9) and on which mandrel the tubular pelt can be mounted or drawn from the thin end of the mandrel with the fur side of the pelt facing inwardly towards the surface of the mandrel and the flesh side of the pelt facing outwardly,
- at least a primary scraping roller (21;22;23;24;25) with a rotation axis being arranged at each side face of the mandrel and being, by means of a motor (30), rotatable about its rotation axis, each of said scraping rollers being configured, during operation of the apparatus, to be engageable with and scrape the flesh side portion of the pelt on the respective side face of the mandrel at which it is arranged, each scraping roller having two mutually spaced end faces and a roller surface extending between said end faces and comprising a number of scraping teeth being mutually spaced along the circumference of the roller surface, and
- a drive for a linear movement of the mandrel in relation to the scraping rollers in the longitudinal direction of the mandrel,

wherein the mandrel (7) has a cross-section as a

convex, especially essentially symmetrical pentagon being symmetrical about a straight line between the middle point of a first side and the opposite vertex,

said first side (1) of the pentagonal cross-section of the mandrel defining a first side face (11) of the mandrel, the first primary scraping roller (21) being arranged at said side face, the pentagonal cross-section further comprising a second and a third mutually diverging side (2;3) extending from opposite ends of the first side (1) and respectively defining a second and a third side face (12; 13) of the mandrel (7), and a fourth and a fifth side (4;5) extending convergently from respective ends of the second and third sides of the pentagon to meet in the vertex (26) opposite the first side (1) of the pentagon and respectively defining the fourth and fifth side faces (14;15) of the mandrel (7), the second and the third primary scraping roller (22;23) being arranged respectively at the second and the third side face, and the fourth and the fifth primary scraping roller (24;25) being arranged respectively at the fourth and the fifth side face.

2. An apparatus according to claim 1, wherein the mandrel (7) has a cross-section as a regular pentagon, i.e. a pentagon where all sides are equal and all angles are equal or has a cross-section as an irregular symmetrical pentagon, wherein the first side (1) is preferably longer than the fourth and the fifth sides (4;5) of the pentagon, such as 3 to 30 % , alternatively 5-20% longer and the second and third sides (2;3) are preferably also longer than the fourth and the fifth sides (4;5) of the pentagon, such as 3 to 30 % , alternatively 5 to 20 % longer.
3. An apparatus according to any of the preceding claims, wherein an additional first scraping roller (31) is arranged at the first preferably upper side face (11) of the mandrel (7) and is configured, during operation of the apparatus, to be engageable with and scrape the flesh side portion of the pelt superjacent the upper side face of the mandrel.
4. An apparatus according to any of the preceding claims, wherein an additional second and third scraping roller (32;33) is arranged respectively at the second and third preferably downwardly diverging side faces (12; 13) of the mandrel and configured, during operation of the apparatus, to be engageable with and scrape the flesh side portion of the pelt superjacent the respective side faces of the mandrel.
5. An apparatus according to any of the preceding claims, wherein an additional fourth and fifth scraping roller (34;35) is arranged respectively at the fourth and fifth preferably downwardly converging side faces (14; 15) of the mandrel (7) and configured,

during operation of the apparatus, to be engageable with and scrape the flesh side portion of the pelt superjacent the respective side faces of the mandrel.

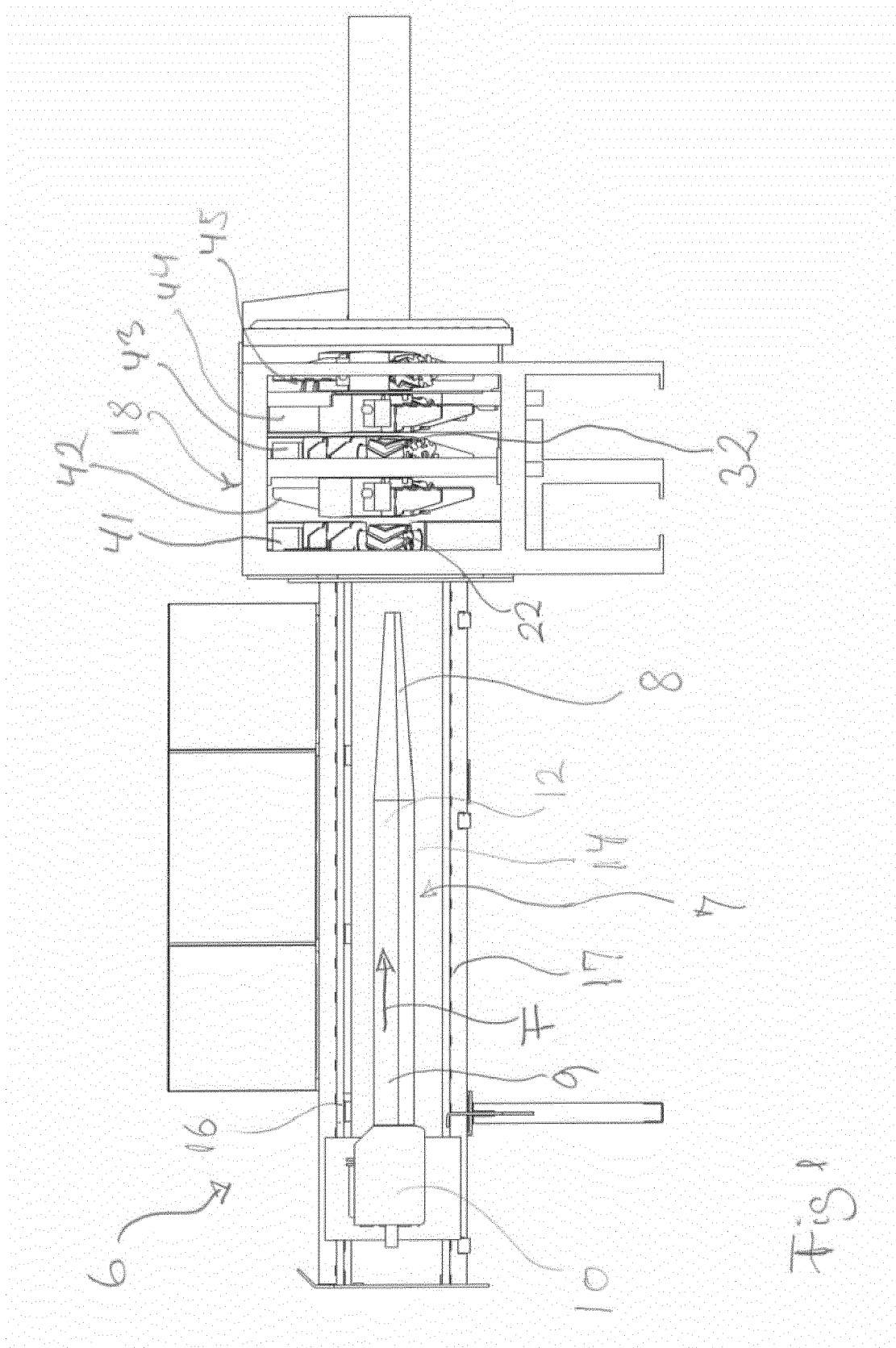
6. An apparatus according to any of the preceding claims, wherein the primary scraping rollers (21;22;23;24;25) are arranged, during engagement with and scraping of the flesh side of the pelt, to rotate in the direction from the thin end (8) towards the thick end (9) of the mandrel (7), i.e. in the opposite direction of the longitudinal forward direction (F) of the mandrel (7) during scraping of the fur, and the additional scraping rollers (31;32;33;24;35) are arranged, during engagement with and scraping of the flesh side of the pelt, to rotate in the direction from the thin end (8) towards the thick end (9) of the mandrel (7), i.e. in the opposite direction of the longitudinal forward direction (F) of the mandrel during scraping of the fur.
7. Apparatus according to any of the preceding claims, wherein the primary scraping roller (21) and optionally an additional scraping roller (31) at the first side face (11) of the mandrel (7) is a scraping roller having V-shaped teeth, the vertex of the V-shaped teeth preferably facing opposite the direction of rotation of the scraping roller(s).
8. An apparatus according to any of the preceding claims, wherein the primary scraping roller (22;23) at the second and third side faces (12; 13) of the mandrel (7) is on each of said faces a helix roller pulling/forcing the pelt in the same direction transversely of the longitudinal direction of the mandrel, the direction being preferably away from the first side face (11) of the mandrel, i.e. downwardly from the first side face.
9. An apparatus according to any of the preceding claims, said apparatus comprising an additional scraping roller (32;33) at the second and third side faces (12; 13), the additional scraping roller (32;33) being on each of said faces a helix roller preferably pulling/forcing the pelt in the opposite direction transversely of the longitudinal direction of the mandrel than the primary helix rollers on each of said side faces, the direction being preferably towards the first side face (11) of the mandrel, i.e. upwardly towards the first side face.
10. An apparatus according to any of the preceding claims, wherein the primary scraping roller (24;25) at the fourth and fifth side faces (14;15) is on each of said faces a helix roller, the primary scraping roller (25) on the fifth side face (15) being a helix roller pulling/forcing the pelt in a direction transversely of the longitudinal direction of the mandrel, the direction being preferably towards the first side face of the

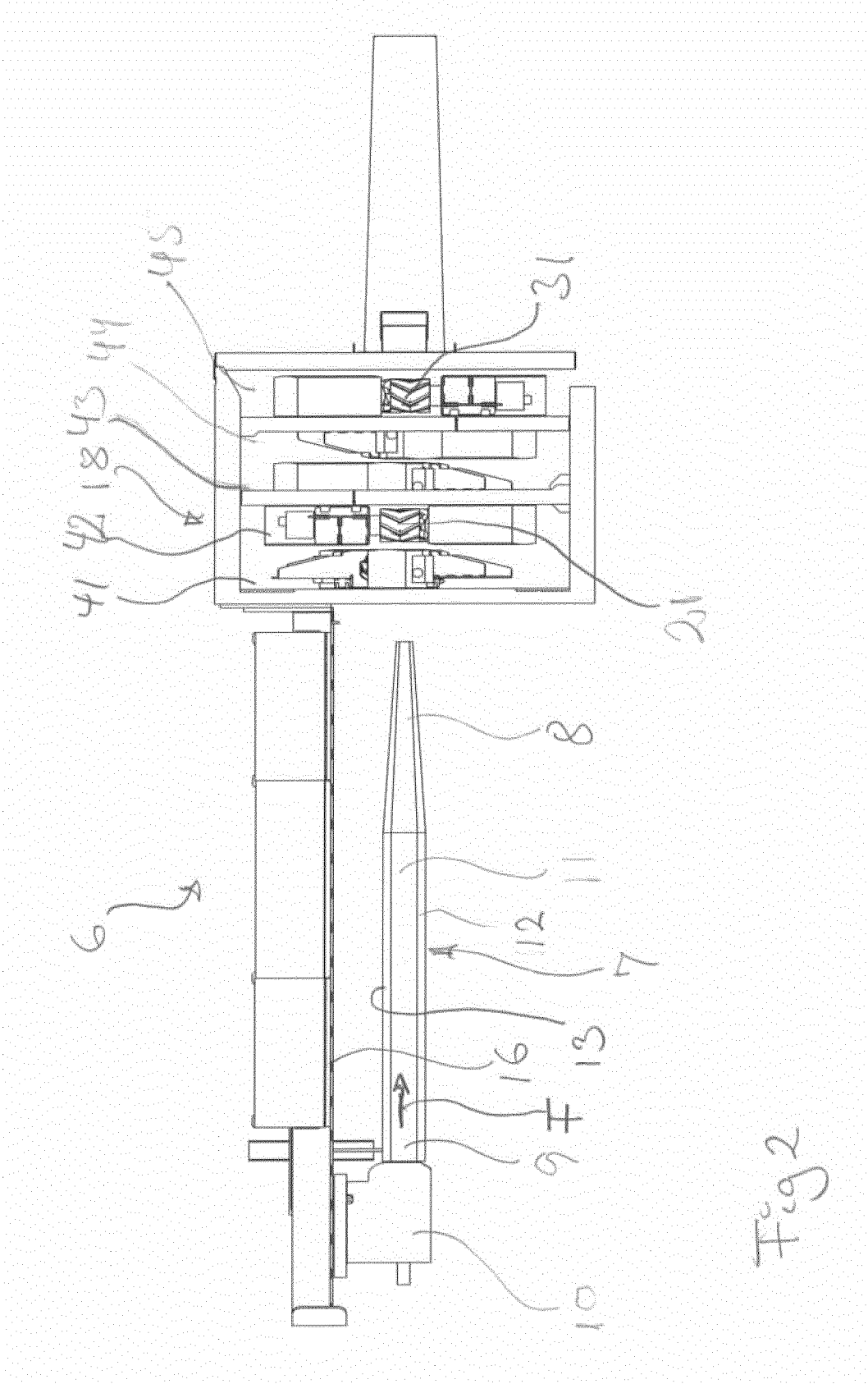
mandrel, and the primary scraping roller (24) at the fourth side face (14) of the mandrel being a helix roller pulling/forcing the pelt in a direction transversely of the longitudinal direction of the mandrel, said direction being towards or away from the first side face (11) of the mandrel, i.e. upwardly towards or downwardly away from the first upper side face (11).

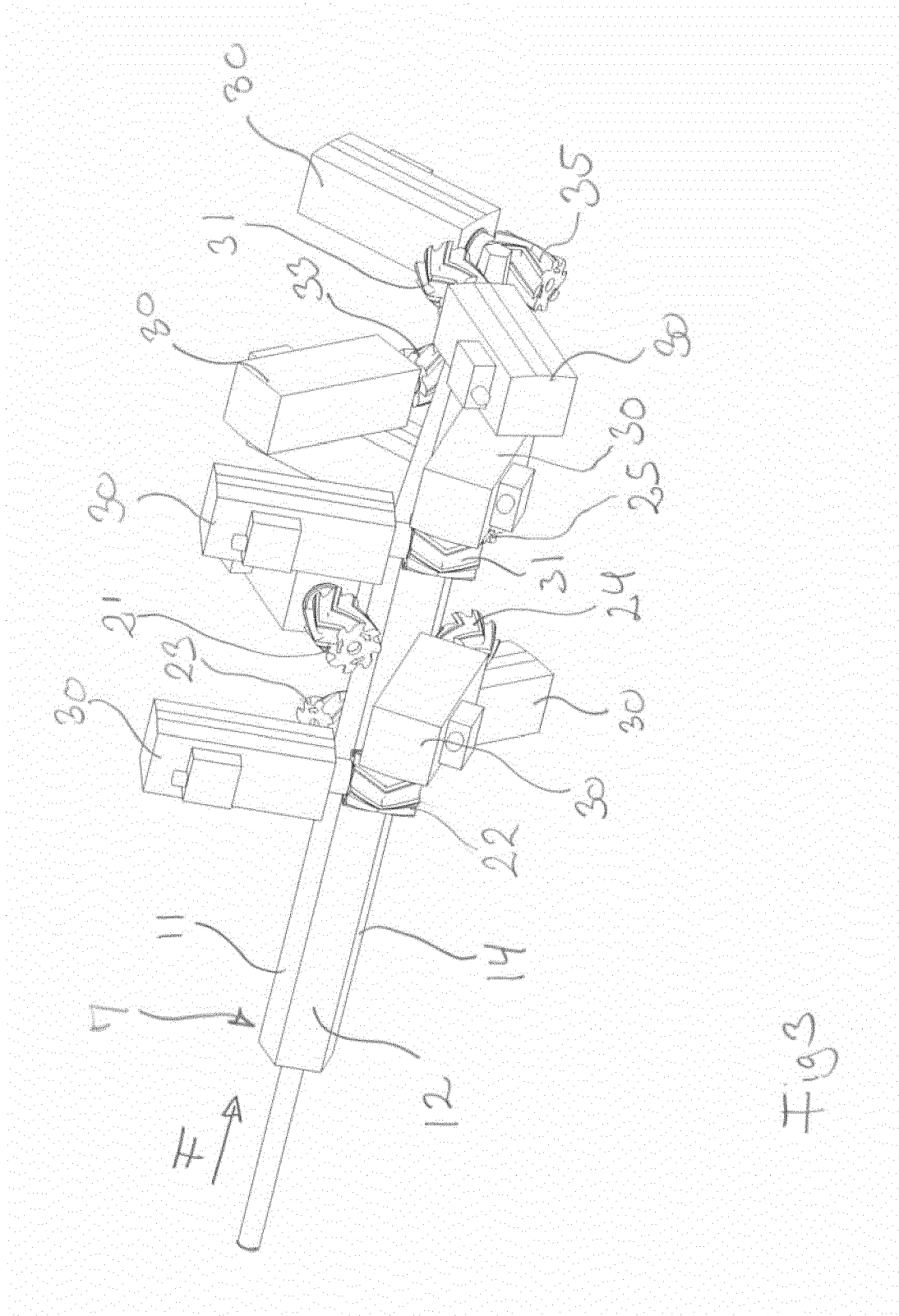
11. An apparatus according to any of the preceding claims, said apparatus comprising an additional scraping roller (34;35) at the fourth and fifth side faces (14;15), the additional scraping roller (34;35) being on each of said faces a helix roller, the additional scraping roller (34) at the fourth side face (14) pulling/forcing the pelt in a direction transversely of the longitudinal direction of the mandrel, preferably in a direction opposite to that of the primary scraping roller (24) at the fourth side face (14), and the additional scraping roller (35) on the fifth side face (15) pulling/forcing the pelt in a direction transversely of the longitudinal direction of the mandrel, the direction being in the opposite or the same direction as the primary scraping roller (25) at the fifth side face (15).
12. An apparatus according to any of the preceding claims, wherein the scraping rollers are arranged in a scraping roller housing (18) comprising as seen in the forward movement direction F of the mandrel into the housing the following consecutive sections:
 - a first section comprising the second primary scraping roller (22) at the second side face (12) of the mandrel and the third primary scraping roller (23) at the third side face of the mandrel, both the first and the second primary scraping roller being a helix roller pulling/forcing the pelt in a direction transversely of the longitudinal direction of the mandrel, the direction being towards the first or upper side face (11) of the mandrel, and
 - a second section comprising a first primary scraping roller (21) being a V-roller arranged at the first or upper side face (11) of the mandrel and an additional primary scraping roller such as a fourth primary scraping roller (24) arranged at the fourth side face (14) and being a helix roller pulling/forcing the pelt in a direction transversely of the longitudinal direction of the mandrel, the direction being towards or away from the first or upper side face (11) of the mandrel.
13. An apparatus according to claim 12 comprising a third section arranged consecutive to the second section and comprising a fifth primary scraping roller (25) arranged at the fifth side face (15) of the mandrel and an additional scraping roller such as a second additional scraping roller (32) arranged at the second side face (12), the fifth primary scraping roller and

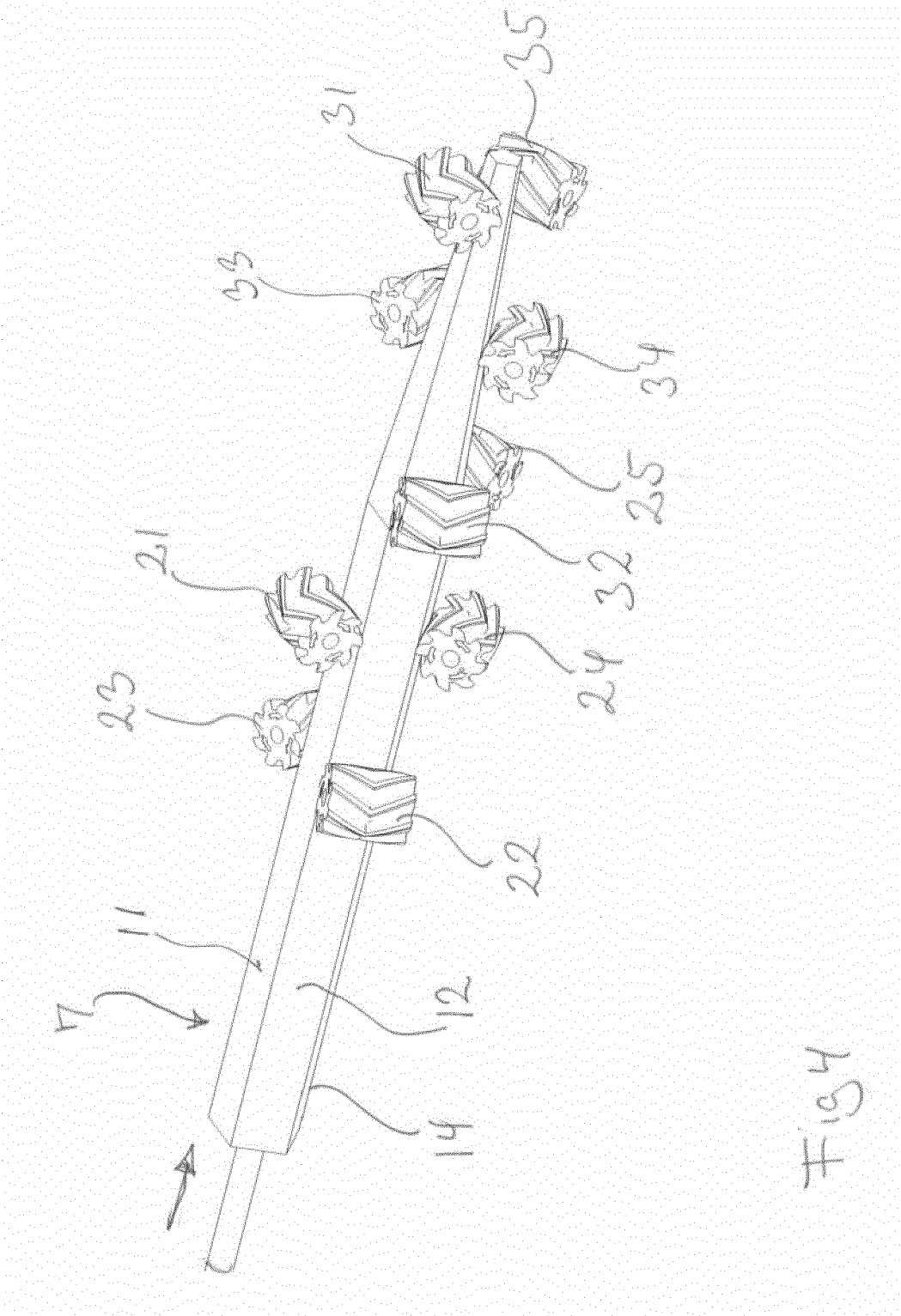
the second additional scraping roller being a helix roller pulling/forcing the pelt a direction transversely of the longitudinal direction of the mandrel, the direction being towards the first or upper side face (11) of the mandrel.

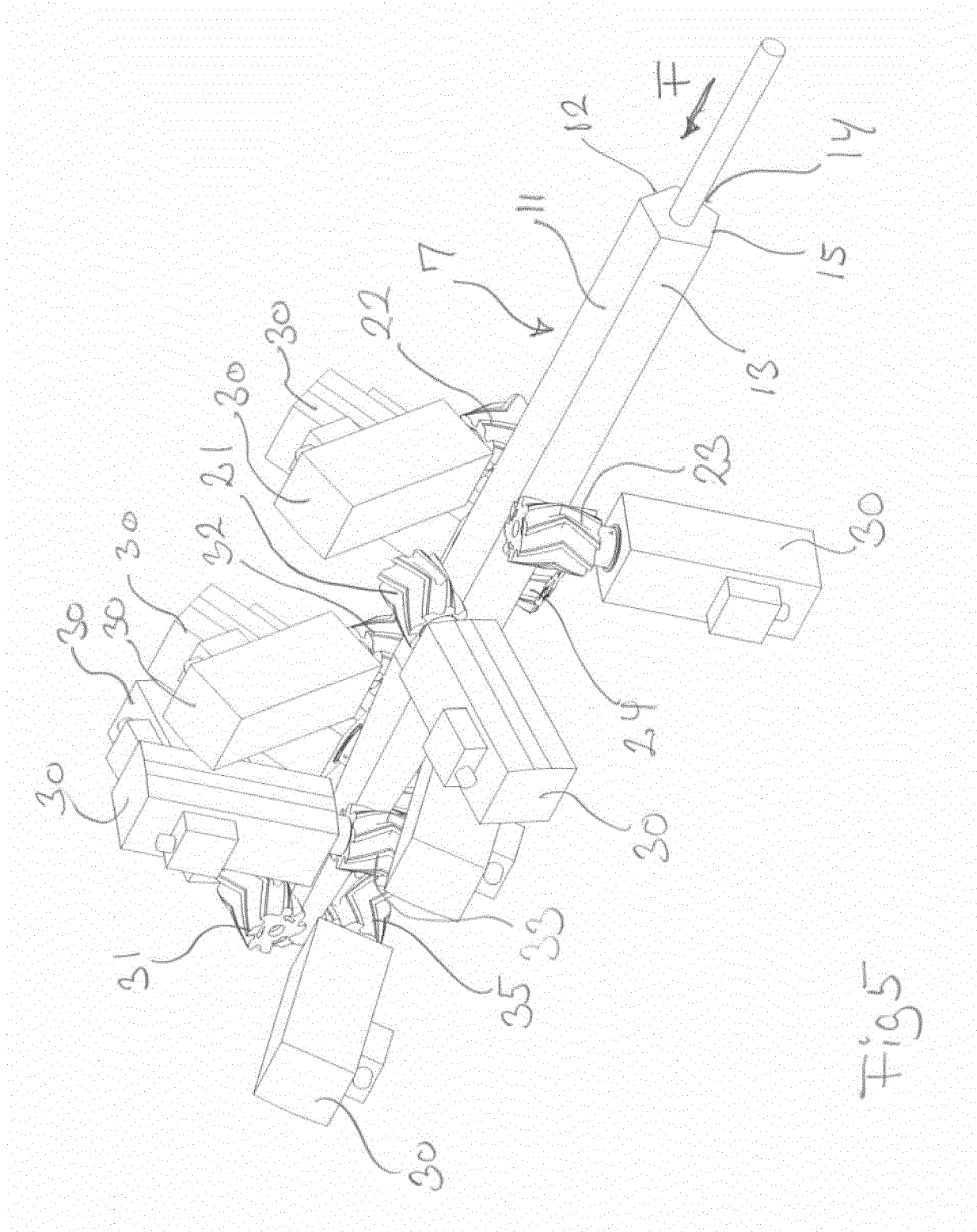
14. An apparatus according to claim 13 comprising a fourth section arranged consecutive to the third section and comprising a third additional scraping roller (33) arranged at the third side face (13) and an additional scraping roller such as fourth additional scraping roller (34) arranged at the fourth side face (14) of the mandrel, both said third and fourth additional scraping rollers being a helix roller pulling/forcing the pelt in a direction transversely of the longitudinal direction of the mandrel, said direction of the third additional scraping roller (33) being upwardly towards the first or upper side surface (11) of the mandrel, and the direction of the fourth additional scraping roller (34) being upwardly towards or downwardly away from the first or upper side face (11) of the mandrel, and preferably opposite to that of the fourth primary scraping roller (24) on the fourth side face (14) of the mandrel, such as upwardly towards the first or upper side face (11) of the mandrel.
15. An apparatus according to claim 14 comprising a fifth section arranged consecutive to the fourth section and comprising a first additional scraper roller (31) being a V-roller and an additional scraper roller such as a fifth additional scraper roller (35) being a helix roller pulling/forcing the pelt in a direction transversely of the longitudinal direction of the mandrel, said direction of the fifth additional scraping roller (35) being upwardly towards or downwardly away from the first or upper side surface (11) of the mandrel.

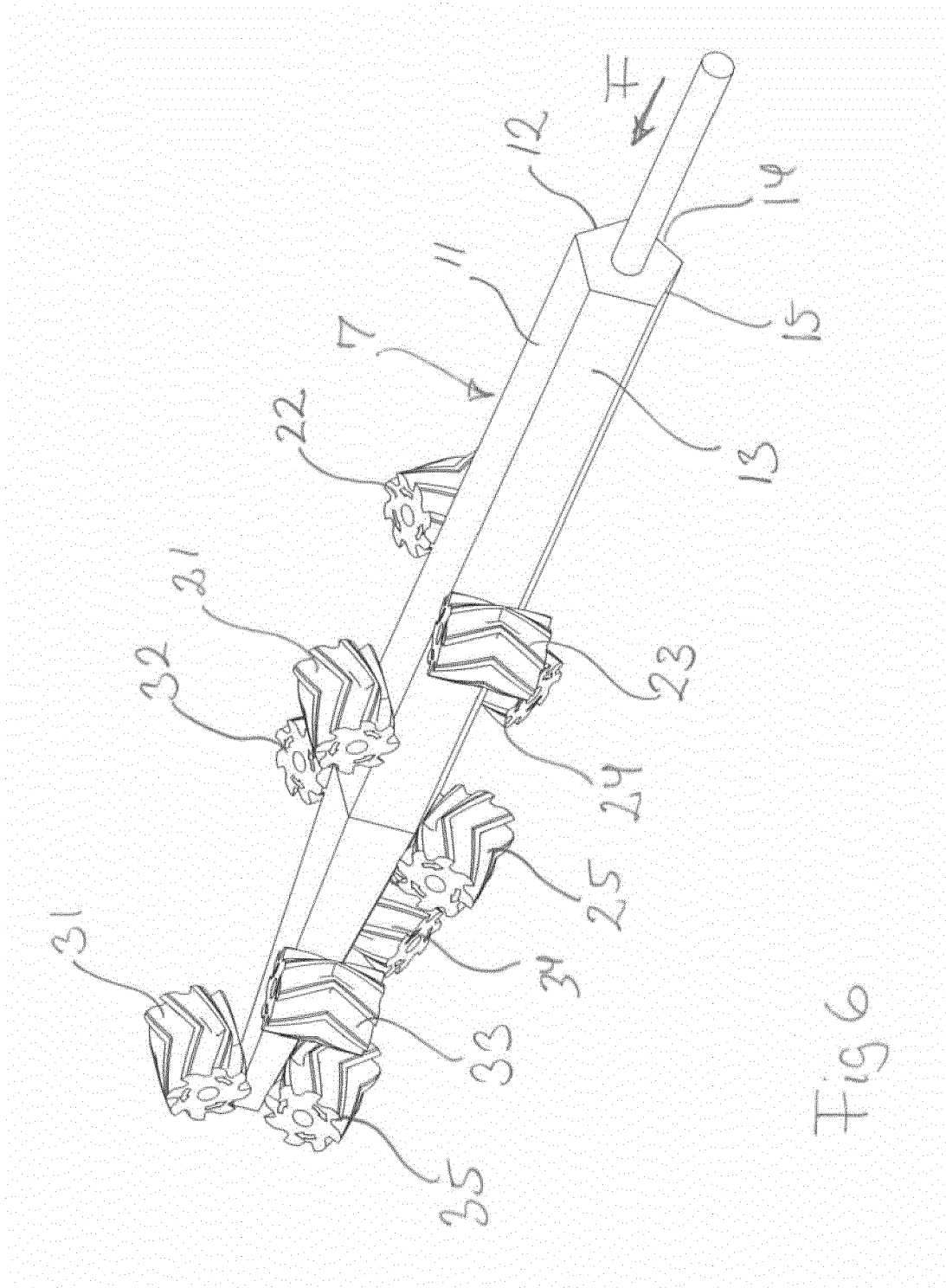


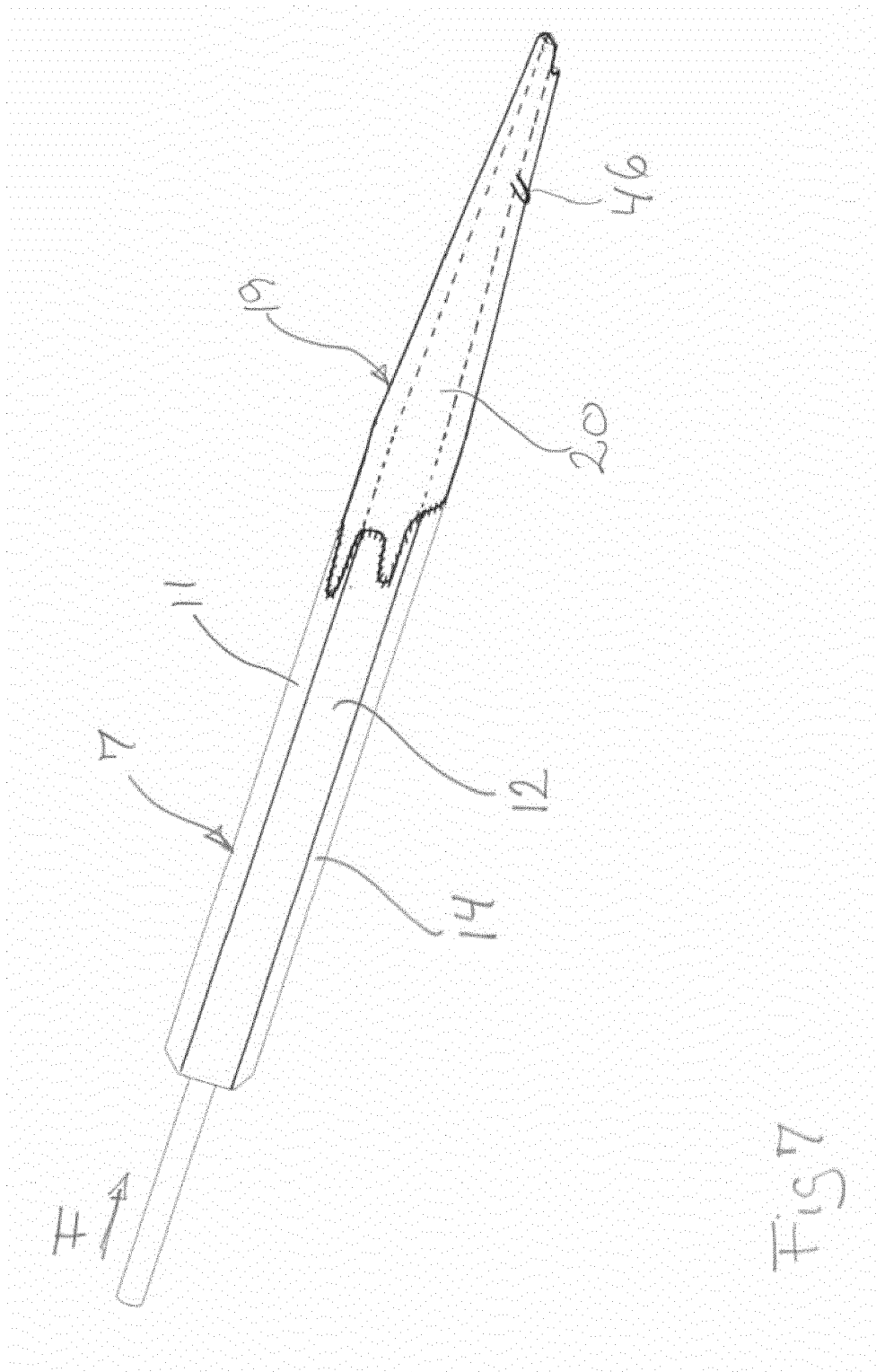


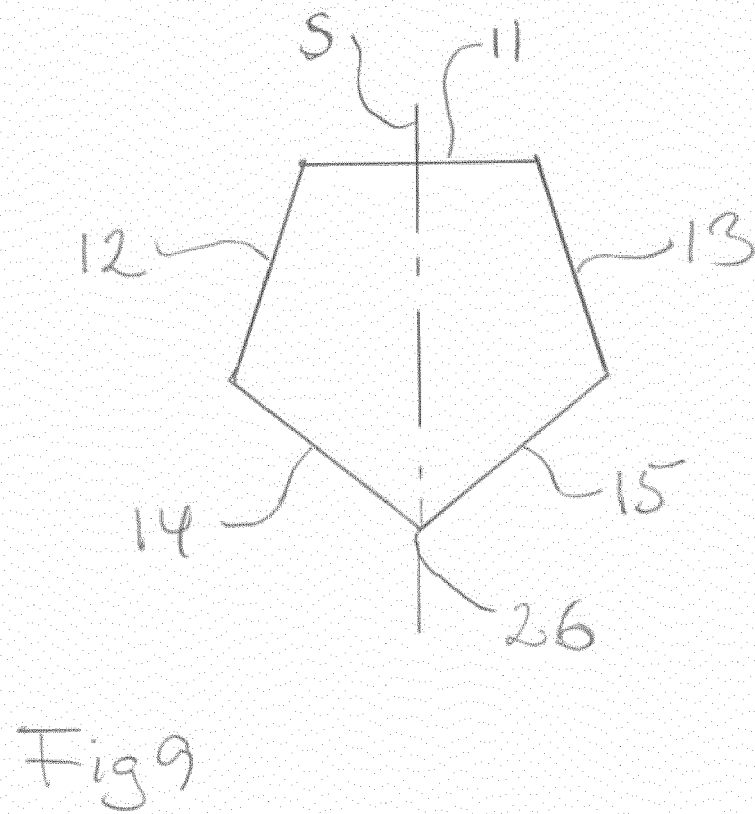
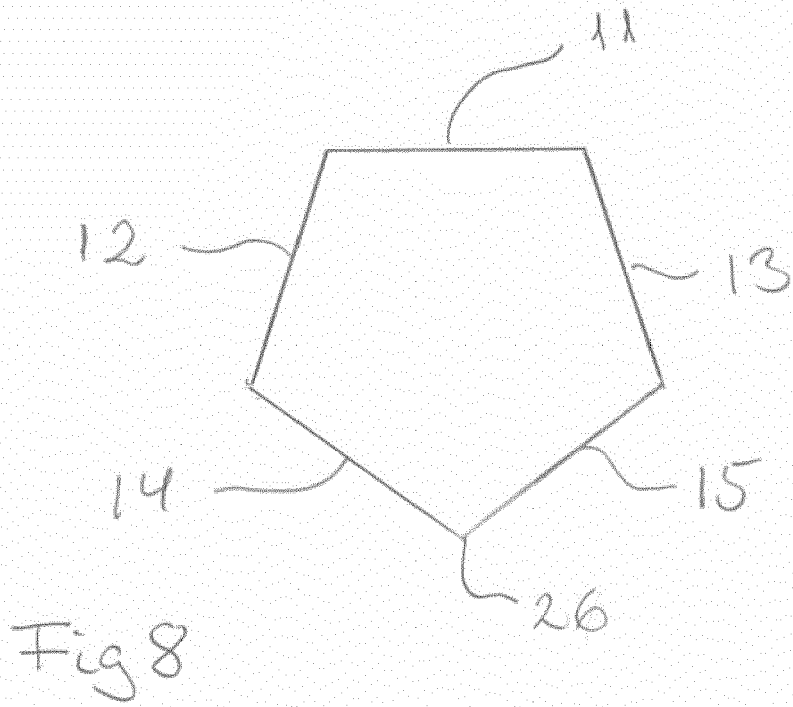


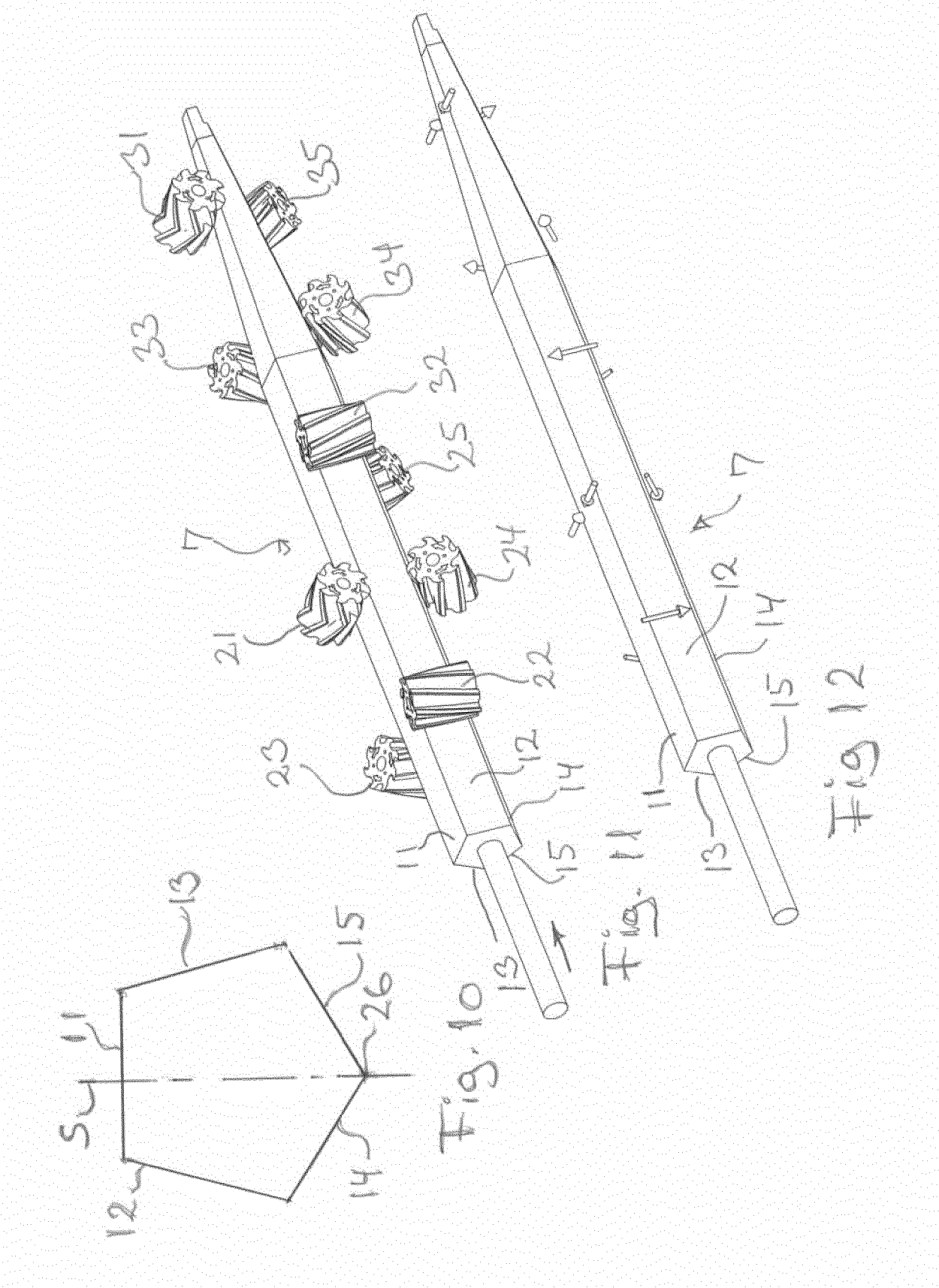














EUROPEAN SEARCH REPORT

Application Number
EP 15 18 2538

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 754 722 A1 (HEDENSTED GRUPPEN AS [DK]) 16 July 2014 (2014-07-16)	1,3-6	INV. C14B17/00 C14B17/02 C14B17/04
A	* paragraph [0026]; claims 1-16 * -----	2,7-15	
X	EP 2 781 606 A1 (HEDENSTED GRUPPEN AS [DK]) 24 September 2014 (2014-09-24)	1,3-6	
A	* paragraph [0029]; claims 1-15 * -----	2,7-15	
A,D	WO 2015/000790 A1 (JASOPELS AS [DK]) 8 January 2015 (2015-01-08) * the whole document *	1-15	
A	EP 2 853 603 A1 (HEDENSTED GRUPPEN AS [DK]) 1 April 2015 (2015-04-01) * the whole document *	1-15	
A	WO 2013/143942 A1 (4M GLOBE MAN LTD [GB]) 3 October 2013 (2013-10-03) * the whole document *	1-15	TECHNICAL FIELDS SEARCHED (IPC) C14B
A,D	WO 2013/056712 A1 (JASOPELS AS [DK]) 25 April 2013 (2013-04-25) * the whole document *	1-15	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 4 November 2015	Examiner Bichi, Marco
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

 3
EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 15 18 2538

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

04-11-2015

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2754722 A1	16-07-2014	NONE	
EP 2781606 A1	24-09-2014	NONE	
WO 2015000790 A1	08-01-2015	DK 201300136 U4 DK 201370373 A1 WO 2015000790 A1	13-12-2013 26-01-2015 08-01-2015
EP 2853603 A1	01-04-2015	DK 201470238 A1 EP 2853603 A1	23-03-2015 01-04-2015
WO 2013143942 A1	03-10-2013	CA 2868375 A1 DK 177568 B1 EP 2831289 A1 US 2015052955 A1 WO 2013143942 A1	03-10-2013 28-10-2013 04-02-2015 26-02-2015 03-10-2013
WO 2013056712 A1	25-04-2013	DK 177365 B1 DK 201300007 U3 DK 201300008 U3 WO 2013056712 A1	18-02-2013 22-02-2013 22-02-2013 25-04-2013

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- DK 177520 B1 **[0003]**
- DK 177365 B1 **[0003]**
- DK 177975 B1 **[0003]**
- DK 177954 B1 **[0003]**
- DK 156669 B3 **[0003]**
- EP 2093299 A1 **[0003]**
- WO 12019606 A **[0003]**