



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**27.02.2013 Bulletin 2013/09**

(51) Int Cl.:  
**C14B 1/02 (2006.01) C14B 15/00 (2006.01)**  
**C14B 17/02 (2006.01)**

(21) Application number: **12181190.5**

(22) Date of filing: **21.08.2012**

(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**

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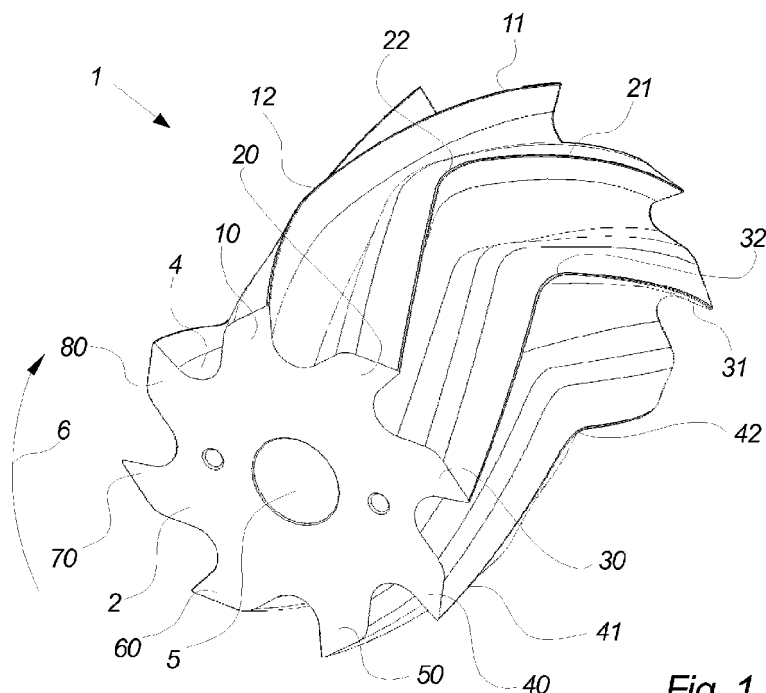
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(30) Priority: **26.08.2011 DK 201100644**

(54) **A scraping roller**

(57) The present invention relates to a scraping roller (1) for scraping the skin side of an animal pelt, said roller comprising a plurality of teeth (10, 20, 30, 40, 50, 60, 70, 80), each tooth comprising a scraping edge (11, 21, 31, 41, 51, 61, 71, 81) having a vertex (12, 22, 32, 42, 52, 62, 72, 82), wherein the axial position of the vertex (12) of the scraping edge (11) of a first tooth (10) has a minimum axial distance from one end (2) of the scraping roller and the axial position of the vertex (52) of the scraping edge (51) of a second tooth (50) has a maximum axial

distance from said one end (2) of the scraping roller, and wherein at least one of said plurality of teeth (20, 30, 40) is situated intermediate between said first tooth (10) and said second tooth (50) and at least one of said plurality of teeth (60, 70, 80) is situated intermediate between said second tooth (50) and said first tooth (10), these intermediately situated teeth (20, 30, 40, 60, 70, 80) being formed so that the axial position of the vertex of the scraping edge of successive teeth varies gradually between said minimum distance and said maximum distance.



**Fig. 1**

**Description**

[0001] The invention relates to a scraping roller for scraping the skin side of an animal pelt.

**Background**

[0002] Various scraping rollers for apparatuses for scraping the skin side of an animal pelt such as a mink pelt are known.

[0003] US 4,745,782 discloses an apparatus with a scraping roller for scraping the skin side of an animal pelt. The scraping roller comprises a plurality of peripherally spaced teeth having scraping edges defining a substantially circular cylindrical surface. Each of the scraping edges is substantially V-shaped and defines an obtuse angle and the scraping edges are substantially symmetrical with respect to the central symmetry plane of the scraping roller.

[0004] DK 173 611 B1 discloses another apparatus with a scraping roller for scraping the skin side of an animal pelt. The scraping roller comprises scraping edges extending in the longitudinal direction of the scraping roller to rotate a tubular skin on a mandrel of the apparatus.

[0005] Danish patent application No. DK 2010 70431 in the name of Pamutec discloses a further apparatus with a scraping roller comprising curved scraping edges for scraping the skin side of an animal pelt. The scraping edges are symmetrical with respect to the central symmetry plane of the scraping roller and are in principle of a V-shape. However, the scraping edges have a gap at the vertex, i.e. at the top of the V and the two parts of each scraping edge are in some embodiments formed to overlap at the vertex.

[0006] Scraping rollers with scraping edges are known to cause parts of the apparatus on which the scraping roller is arranged to vibrate unintentionally during operation, especially if the roller or rollers on the apparatus causes the apparatus to vibrate with an eigenfrequency of the apparatus or a part of the apparatus. Such vibrations may influent negatively on the quality of the scraping, and/or may cause increased wear on parts of the apparatus.

[0007] It is an object of the present invention to reduce or avoid this problem of the known scraping rollers. It is a further object of the present invention to improve the design of the scraping roller in order to obtain a more satisfactory result of the scraping of the skin side of the furs by means of the scraping rollers.

**Brief description of the invention**

[0008] The present invention relates to a scraping roller for scraping the skin side of an animal pelt, said roller comprising a plurality of teeth, each tooth comprising a scraping edge having a vertex, wherein the axial position of the vertex of the scraping edge of a first tooth has a minimum axial distance from one end of the scraping roller and the axial position of the vertex of the scraping edge of a second tooth has a maximum axial distance from said one end of the scraping roller, and

wherein at least one of said plurality of teeth is situated intermediate between said first tooth and said second tooth and at least one of said plurality of teeth is situated intermediate between said second tooth and said first tooth, these intermediately situated teeth being formed so that the axial position of the vertex of the scraping edge of successive teeth varies gradually between said minimum axial distance and said maximum axial distance.

[0009] With the term axial position of the vertex is understood the position with respect to the axial direction of the roller and likewise, the axial distance is measured as the distance in the axial direction of the roller. Thus, the axial distance of a vertex from the first end of the scraping roller is the distance in the axial direction of the roller from the first end of the scraping roller and to the axial position of the vertex.

[0010] The axial positions of the vertices of the scraping blades of a roller according to the present invention may comprise more than one maximum and one minimum, e.g. two of each with e.g. one or two intermediate teeth between each minimum and the consecutive maximum and between each maximum and the consecutive minimum, so that the roller comprises eight or twelve teeth, respectively. However, it is preferred that the axial positions of the vertices of the scraping blades of the roller comprise one maximum and one minimum only.

[0011] The scraping edges are preferably continuous edges extending from one end of the scraping roller to the other, but the scraping edges may alternatively be provided with on or more openings along the extent thereof, such as at the vertex. In a particular embodiment, the parts of the scraping edges on the two sides of the vertex are displaced from each other in the angular direction of the roller at the vertex and define an opening there between, and the parts of the scraping edges may even be overlapping at the vertex.

[0012] With the term vertex may be understood a sharp corner, in particular an obtuse angle between the parts of the scraping edge extending on each side of the vertex. In this case, the scraping edge is said to be of a V-shape. Alternatively, the vertex may be of a rounded shape, e.g. with a radius of curvature in the range of 15 to 40 millimetres, such as 20 to 30 millimetres, in which case the scraping edge is said to be of a U-shape.

[0013] By arranging the scraping edges with different positions of the vertices as described above, it is possible to reduce or even avoid vibrations of the apparatus at an eigenfrequency of the apparatus. The different positions facilitates

that the frequency spectre of the vibrations when the edges engages with the skin side may be spread over a range of frequencies defined e.g. by the rotation speed of the roller and the positions of the vertices.

[0014] It is furthermore preferred that the scraping roller is provided with at least two intermediate teeth situated between the first tooth and the second tooth, and with at least two intermediate teeth situated between the second tooth and the first tooth. Thus, a satisfactory result may be obtained with at least six teeth on the roller, and the experience has shown that a number of teeth ranging from six to nine teeth is the most suitable number with eight teeth as the most preferred number of teeth.

[0015] The difference in axial position of the vertex of the scraping edge between adjacent teeth of the scraping roller is in a preferred embodiment of the invention substantially the same for any pair of adjacent teeth. Hereby, a smooth operation of the scraping roller is obtained as the change in the engagement of the consecutive teeth with the skin side of the pelt is small.

[0016] The difference between said minimum axial distance and said maximum axial distance is preferably in the range of 20 to 50 millimetres, preferably in the range of 25 to 40 millimetres.

[0017] The height of the vertex of the scraping edges is preferably in the range of 20 to 40 millimetres, more preferably in the range of 25 to 35 millimetres.

[0018] The height of the vertex of the scraping edge is generally understood as the deviation of the scraping edge at the position of the vertex from a straight scraping edge having the same basic position on the scraping roller. Thus, to define the height of the vertex of a scraping edge only makes sense when the end points of the scraping edge are situated substantially on one straight line that is parallel with the axis of the roller. However, it should be noted that the present invention is not generally limited to scraping rollers having teeth with such scraping edges, but it is a preferred embodiment of the scraping rollers according to the present invention.

[0019] It has furthermore proven to be advantageous that the scraping edges are curved

[0020] Moreover, the invention relates to use of a scraping roller as defined herein for scraping of the skin side of a pelt.

[0021] Likewise, the invention relates to an apparatus for scraping of the skin side of mink pelts comprising one or more scraping rollers as defined herein.

## Figures

[0022] The invention will be described in the following with reference to the figures in which:

Fig. 1 illustrates a preferred embodiment of a scraping roller seen in perspective,

Fig. 2 illustrates the scraping roller of fig. 1 seen in perspective from another angle, and

Fig. 3 illustrates the scraping roller of figs. 1 and 2 seen from a further angle.

## Detailed description

[0023] Figs. 1-3 illustrate a preferred embodiment of a scraping roller 1 seen in perspective. The scraping roller 1 has opposing, substantially plane end surfaces 2, 3 and a peripheral surface 4 extending there between. The peripheral surface 4 comprises a eight peripherally spaced teeth 10, 20, 30, 40, 50, 60, 70, 80 having U-shaped scraping edges 11, 21, 31, 41, 51, 61, 71, 81, the teeth 10, 20, 30, 40, 50, 60, 70, 80 extending from one end surface 2 to the other end surface 3 of the roller 1.

[0024] The roller is provided with an axial bore 5 for receiving a driving shaft of a driving electric motor for rotating the roller around its centre axis to scrape the skin side of an animal pelt such as a mink pelt. The pelts are preferably tubular shaped mink pelts arranged on a mandrel with the skin surface facing outwards and the fur side facing inwards.

[0025] The scraping roller 1 is preferably made from rubber (natural and/or synthetic rubber), a plastics material, and/or a similar resilient material or combinations of such materials. Preferred materials are polyurethane (PUR) and silicone rubber.

[0026] The roller 1 is configured to be rotated in the direction indicated by an arrow 6. This means that the skin side of the pelt being treated will first come into engagement with the free outer ends of each scraping edge 11, 21, 31, 41, 51, 61, 71, 81 near the ends 2, 3 of the roller 1, and when the rotation of the roller proceeds, the points of engagement of each scraping edge 11, 21, 31, 41, 51, 61, 71, 81 will move towards the vertex 12, 22, 32, 42, 52, 62, 72, 82 of the U-shaped scraping edge 11, 21, 31, 41, 51, 61, 71, 81 and will tend to draw the fur towards this vertex 12, 22, 32, 42, 52, 62, 72, 82. The scraping edges 11, 21, 31, 41, 51, 61, 71, 81 are designed so that the distances from the vertices 12, 22, 32, 42, 52, 62, 72, 82 to a first end surface 2 of the roller 1 are varied gradually between a minimum distance and a maximum distance with an average distance of half the distance between the two end surfaces 2, 3 so that the difference in the longitudinal (i.e. axial) direction of the roller 1 of the position of the vertex between any two adjacent

teeth 10, 20, 30, 40, 50, 60, 70, 80 is substantially the same.

**[0027]** Thus, when the roller 1 is rotated, a first scraping edge 11 of a first tooth 10 with a vertex 12 at a minimum distance from the first end surface 2 comes into engagement with the skin side of the pelt, followed by a second tooth 20 having a scraping edge 21 with a vertex 22 that is a larger distance from the first end surface 2, a third tooth 30 having a scraping edge 31 with a vertex 32 that is a yet larger distance from the first end surface 2, a fourth tooth 40 and a fifth tooth 50 having a scraping edge 51 with a vertex 52 at the maximum distance from the first end surface. The distances in the axial (i.e. longitudinal) direction of the roller 1 from the vertices 12, 22, 32, 42, 52 to the first end surface 2 are substantially evenly distributed so that the increase in distance is substantially the same between any two adjacent vertices 12, 22, 32, 42, 52. The remaining teeth 60, 70, 80 are designed in a similar way, whereby the distances from the vertices 52, 62, 72, 82, 12 to the first end surface 2 are substantially evenly distributed so that the decrease in distance from the first end surface 2 is substantially the same between any two adjacent vertices 52, 62, 72, 82, 12.

**[0028]** The skin side of the pelt being treated by the roller 1 will be engaged by scraping edges 11, 21, 31, 41, 51, 61, 71, 81 with vertices 12, 22, 32, 42, 52, 62, 72, 82 where the transversal position of vertex of the engaging scraping edge is moved back and forth in a transversal reciprocal movement due to the transversal positioning of the vertices 12, 22, 32, 42, 52, 62, 72, 82 and the rotation of the roller 1. The reciprocal movement will have a centre around the middle of the roller 1 with deviations of plus or minus 15 millimetres from the middle of the 156 millimetres long roller 1, i.e. a deviation of plus or minus 10% of the length of the roller. The embodiments shown in the enclosed figures have a deviation of twice that magnitude for the sake of distinct illustration.

**[0029]** Thus, the distances in the axial direction of the roller 1 from one end surface 2 to the position of the vertex 12, 22, 32, 42, 52, 62, 72, 82 of the scraping edge 11, 21, 31, 41, 51, 61, 71, 81 of each of the eight teeth 10, 20, 30, 40, 50, 60, 70, 80 are for the preferred embodiment reproduced in the table, where the teeth are listed consecutively and the tooth with reference numeral 80 is followed by the tooth with reference numeral 10.

Tooth reference numeral	Distance (millimetres) in the axial direction of the roller 1 from one end surface 2 and to vertex
10	63
20	70.5
30	78
40	85.5
50	93
60	85.5
70	78
80	70.5

**[0030]** The scraping edges 11, 21, 31, 41, 51, 61, 71, 81 are formed to be situated in a curved plane of a substantial cylindrical shape being coaxial with the roller 1.

**[0031]** The teeth 10, 20, 30, 40, 50, 60, 70, 80 are formed so that they extend from one end surface 2 of the roller 1 to the other end surface 3 and so that the respective end portions of each scraping edge 11, 21, 31, 41, 51, 61, 71, 81 are positioned on the same generatrix of the substantial cylindrical curved plane in which the scraping edges are situated. The height of the vertex 12, 22, 32, 42, 52, 62, 72, 82 of the scraping edge 11, 21, 31, 41, 51, 61, 71, 81 is generally understood as the deviation of the vertex of the scraping edge from a straight scraping edge having the same basic position on the scraping roller. More particularly, the height may be defined as the distance the vertex of the scraping edge deviates from a straight line going through the end portions of the scraping edge and being parallel to the axis of the roller. In other words, the height is defined as the distance between the generatrix passing through the end portions of a scraping edge and the generatrix passing through the vertex of the same scraping edge 11, 21, 31, 41, 51, 61, 71, 81.

**[0032]** The U-shape or alternatively a V-shape of the arc-shape of the scraping edges 11, 21, 31, 41, 51, 61, 71, 81 is provided in order to avoid rotation of the pelt and performing a temporary stretching of the pelt substantially perpendicular to the longitudinal direction of the mandrel. The above-mentioned apparent transversal reciprocal movement of the position of the vertex 12, 22, 32, 42, 52, 62, 72, 82 of the scraping edges 11, 21, 31, 41, 51, 61, 71, 81 that currently is engaging the skin side of the pelt treated by the roller 1 has the additional effect that the pelt is moved slightly back and forth in the transversal direction and at the same time is scraped with scraping edges 11, 21, 31, 41, 51, 61, 71, 81 having different angles with respect to the longitudinal direction of the roller 1, the two effects resulting in an improved scraping of the skin side.

**[0033]** Furthermore, the above-mentioned apparent transversal reciprocal movement of the position of the vertex 12, 22, 32, 42, 52, 62, 72, 82 of the scraping edges 11, 21, 31, 41, 51, 61, 71, 81 that currently is engaging the skin side of the pelt treated by the roller 1 reduces the vibration-inducing effect by the roller 1 on the scraping apparatus at the main frequency, i.e. the number of rotations per second multiplied by the number of teeth on the roller 1. The roller 1 or rollers

1 of the apparatus may cause the apparatus to vibrate with an eigenfrequency of either the apparatus or a part of the apparatus. Such vibrations may influent negatively on the quality of the scraping, and/or may cause increased wear or fatigue on parts of the apparatus and the present roller 1 may reduce or avoid the occurrence of such vibrations.

**[0034]** The teeth 10, 20, 30, 40, 50, 60, 70, 80 are formed so that they extend from one end surface 2 of the roller 1 to the other end surface 3 and so that the respective end portions of each scraping edge 11, 21, 31, 41, 51, 61, 71, 81

are positioned on the same generatrix of the

**[0035]** In an alternative embodiment to the one shown in the enclosed figures, the teeth 10, 20, 30, 40, 50, 60, 70, 80 are formed so that each scraping edge 11, 21, 31, 41, 51, 61, 71, 81 to have an angular overlap in the range of e.g. 2° to 6°, such as in the range of 3° to 5° with the two adjacent scraping edges. With an angular overlap of 4°, this means that each of the eight teeth 10, 20, 30, 40, 50, 60, 70, 80 will extend angularly over  $360^\circ/8 + 2 \times 4^\circ = 53^\circ$  of the roller 1.

The angular overlap has the effect that two adjacent teeth 10, 20, 30, 40, 50, 60, 70, 80 will be in engagement simultaneously with the skin side of the pelt for the time it takes the roller 1 to turn the angular overlap and the vibrations resulting from the use of the roller 1 will be reduced as a result thereof.

#### List of reference numerals

**[0036]**

1:	Scraping roller
2:	First end surface of scraping roller
3:	Second end surface of scraping roller
4:	Peripheral surface
5:	Axial bore
6:	Rotation direction of scraping roller
10, 20, 30, 40, 50, 60, 70, 80:	Teeth
11, 21, 31, 41, 51, 61, 71, 81:	Scraping edges of teeth
12, 22, 32, 42, 52, 62, 72, 82:	Vertex of scraping edges

#### Claims

1. A scraping roller (1) for scraping the skin side of an animal pelt, said roller comprising a plurality of teeth (10, 20, 30, 40, 50, 60, 70, 80), each tooth comprising a scraping edge (11, 21, 31, 41, 51, 61, 71, 81) having a vertex (12, 22, 32, 42, 52, 62, 72, 82), wherein the axial position of the vertex (12) of the scraping edge (11) of a first tooth (10) has a minimum axial distance from one end (2) of the scraping roller and the axial position of the vertex (52) of the scraping edge (51) of a second tooth (50) has a maximum axial distance from said one end (2) of the scraping roller, and wherein at least one of said plurality of teeth (20, 30, 40) is situated intermediate between said first tooth (10) and said second tooth (50) and at least one of said plurality of teeth (60, 70, 80) is situated intermediate between said second tooth (50) and said first tooth (10), these intermediately situated teeth (20, 30, 40, 60, 70, 80) being formed so that the axial position of the vertex of the scraping edge of successive teeth varies gradually between said minimum axial distance and said maximum axial distance.
2. A scraping roller according to claim 1, wherein at least two intermediate teeth (20, 30, 40) are situated between the first tooth and the second tooth, and at least two intermediate teeth (60, 70, 80) are situated between the second tooth and the first tooth.
3. A scraping roller according to claim 1 or 2, wherein the difference in axial position of the vertex of the scraping edge between adjacent teeth of the scraping roller is substantially the same for any pair of adjacent teeth.
4. A scraping roller according to any of the preceding claims, wherein the number of teeth is from 6 to 9, preferably 8.
5. A scraping roller according to any of the preceding claims, wherein the difference between said minimum axial distance and said maximum axial distance is in the range of 20 to 50 millimetres, preferably in the range of 25 to

40 millimetres.

6. A scraping roller according to any of the preceding claims, wherein the scraping edges are substantially of a U-shape.

5 7. A scraping roller according to any of claims 1-5, wherein the scraping edges are substantially of a V-shape.

8. A scraping roller according to any of the preceding claims, wherein the height of the vertex of the scraping edges are in the range of 20 to 40 millimetres, preferably in the range of 25 to 35 millimetres.

10 9. A scraping roller according to any of the preceding claims, wherein the scraping edges are curved.

10. Use of a scraping roller according to any of the claims 1 to 8 for scraping of the skin side of a pelt.

15 11. An apparatus for scraping of the skin side of mink pelts comprising one or more scraping rollers according to any of claims 1-8.

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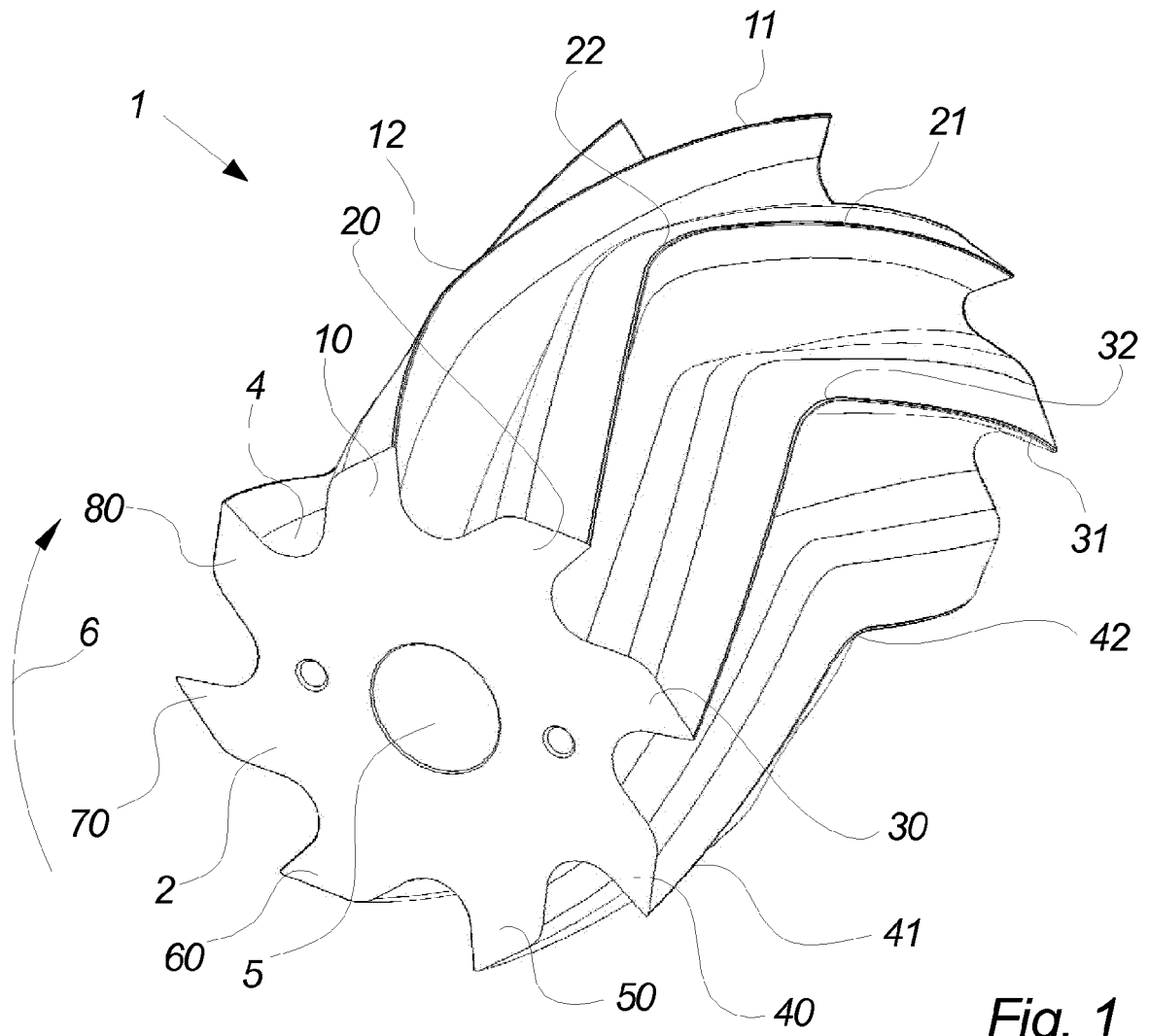


Fig. 1

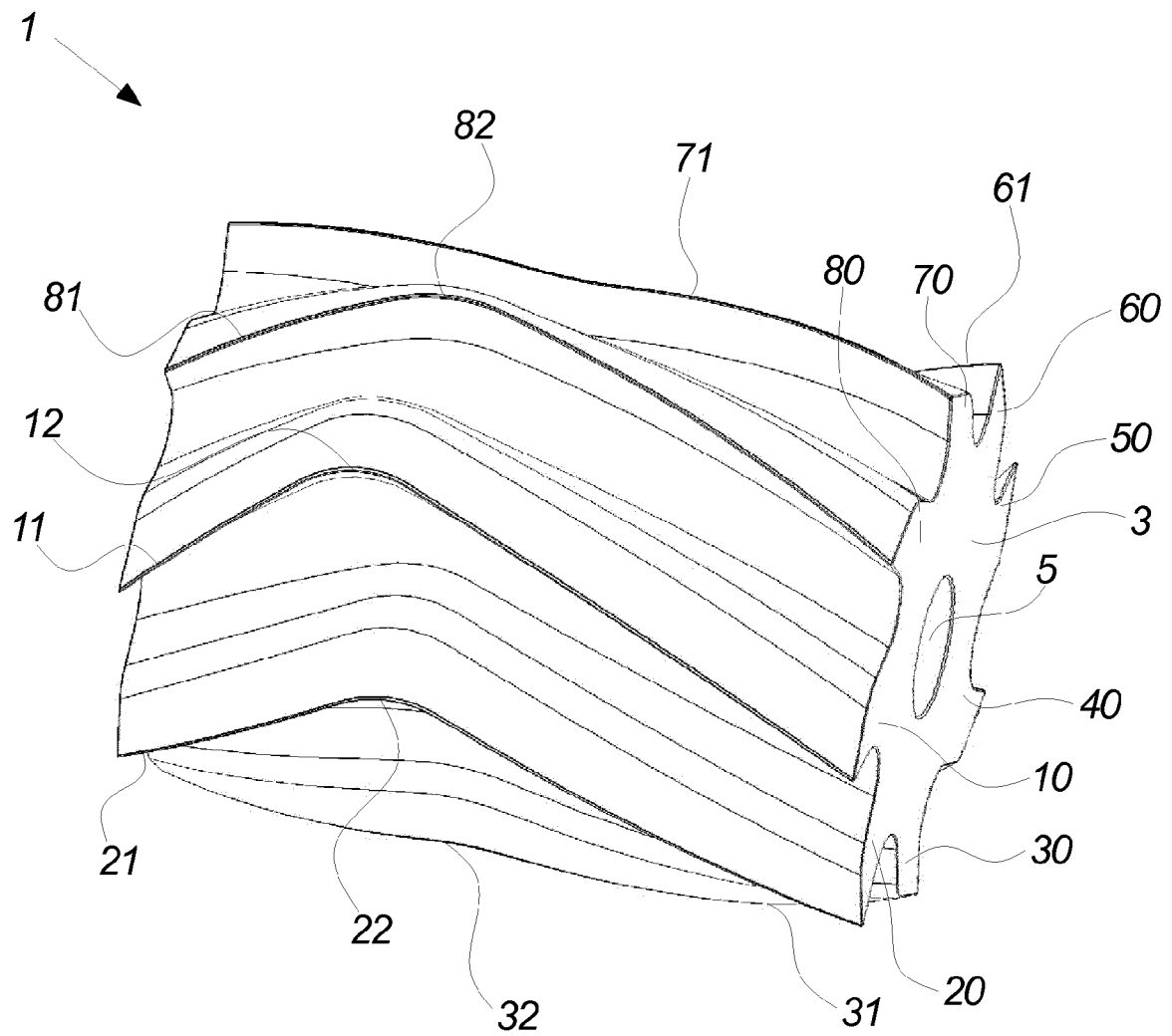


Fig. 2



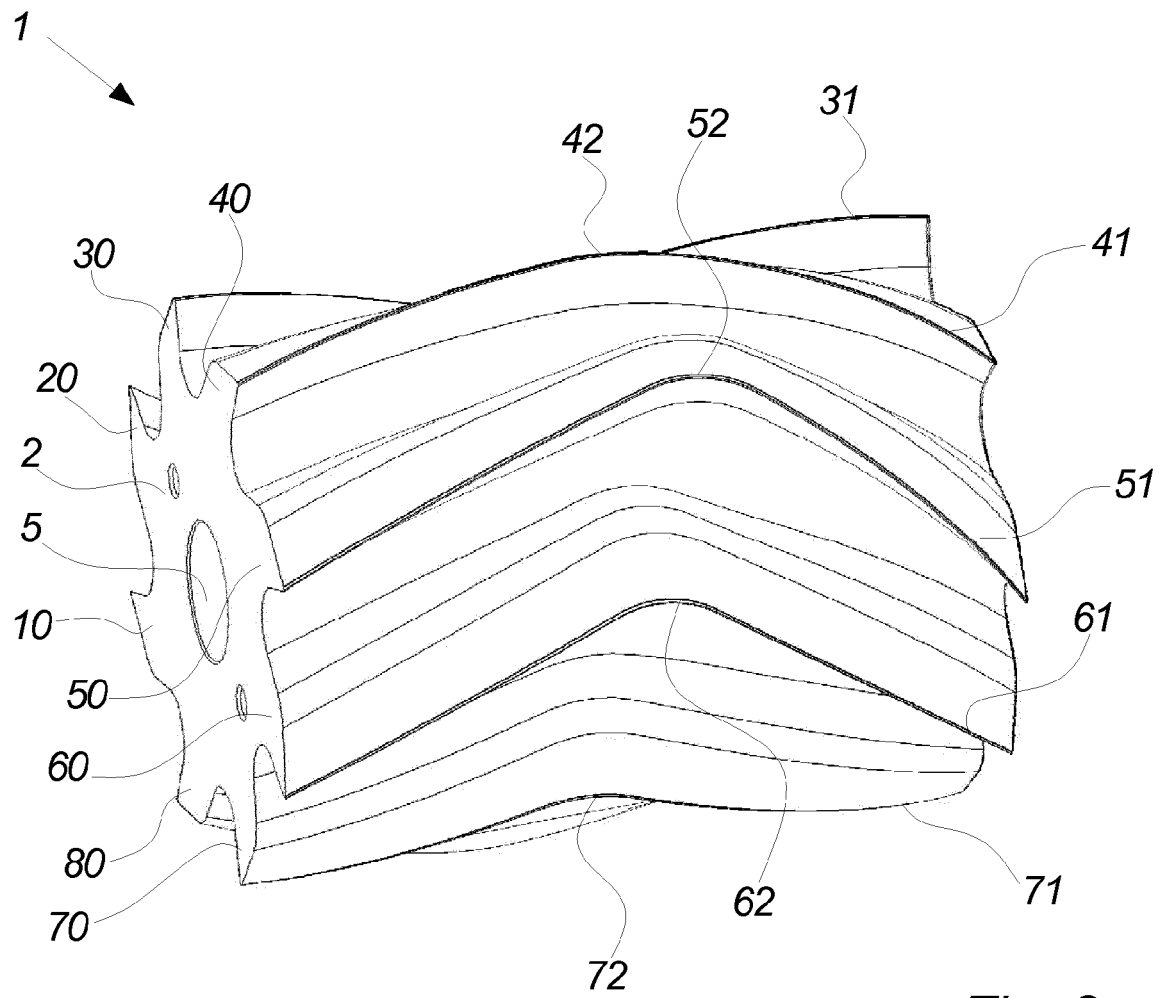


Fig. 3



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Application Number  
EP 12 18 1190

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 2 093 299 A1 (AGERBO POUL [DK] PAMUTEC PATENTS APS [DK]) 26 August 2009 (2009-08-26) * the whole document *	1-11	INV. C14B1/02 C14B15/00 C14B17/02
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 13 November 2012	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			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 12 18 1190

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13-11-2012

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