

(19) **DANMARK**



Patent- og
Varemærkestyrelsen

(12)

Oversættelse af europæisk patentskrift

(10) **DK/EP 2332417 T3**

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- (51) Int.Cl.: **A 22 C 21/00 (2006.01)**
- (45) Oversættelsen bekendtgjort den: **2023-11-06**
- (80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2023-08-16**
- (86) Europæisk ansøgning nr.: **11160158.9**
- (86) Europæisk indleveringsdag: **2006-12-11**
- (87) Den europæiske ansøgnings publiceringsdag: **2011-06-15**
- (30) Prioritet: **2005-12-09 NL 1030638** **2005-12-14 NL 1030671**
- (62) Stamansøgningsnr: **06835655.9**
- (84) Designerede stater: **AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR**
- (73) Patenthaver: **Marel Poultry B.V., Handelstraat 3, 5831 AV Boxmeer, Holland**
- (72) Opfinder: **Janssen, Petrus Christianus Hendrikus, 5, Verbindingsweg, 5455 GP, WILBERTOORD, Holland**
Van Bussel, Gerardus Johannes Catharina, 54, Hazenpad, 5758 CA, NEERKANT, Holland
van den Nieuwelaar, Adrianus Josephes, 33, Den Hoek, 5421 XG, GEMERT, Holland
- (74) Fuldmægtig i Danmark: **RWS Group, Europa House, Chiltern Park, Chiltern Hill, Chalfont St Peter, Bucks SL9 9FG, Storbritannien**
- (54) Benævnelse: **Fremgangsmåde og anordning til forarbejdning af en slagtekropsdel af slagtet fjerkræ**
- (56) Fremdragne publikationer:
EP-A1- 1 430 780
EP-A1- 1 574 133
US-A- 2 243 951
US-A- 3 624 863
US-A- 3 787 926
US-A1- 2005 266 786

DESCRIPTION

[0001] The invention relates to processing a carcass part of slaughtered poultry.

[0002] The prior art has disclosed methods of processing carcass parts of slaughtered poultry into products that are attractive for the consumer such as loose inside and/or outer fillets, inside and outer fillets that are still connected to each other, half outer fillets (that is, an outer fillet from one side of the chicken) with or without the inner fillet still attached, wings with one, two or three members, back meat, quarters, drumsticks and the like.

[0003] Processing is carried out on a specific type of carcass part depending on the end product required or the group of end products required. Examples of such carcass parts are, for example, whole products (made oven-ready), front halves without wings, front halves with the first member of one or both wings, front halves with the first and second member of one or both wings, front halves with the first, second and third member of one or both wings, front halves of one of the aforementioned types with or without skin, breast caps, breast caps with long rib, breast caps with medium rib, half breast caps, breasts, breasts with short rib, back portions without wings, back portions with one or more wings or parts of wings. Variations of these types of carcass parts are also possible as a starting point for processing.

[0004] A carcass part to be processed is placed on a product carrier; this product carrier advances the carcass part to be processed along a path. Processing devices, which perform a specific process on the carcass part, are disposed along this path. The skilled person generally refers to such processing devices as "modules". This patent application relates to several such modules and the processes that they perform. The product carriers can engage on the inside of a carcass part that is to be processed. If the carcass part still comprises one or both legs or part of one or both legs, a product carrier can alternatively engage the leg that is present, the legs that are present, the leg parts that are present or the leg part that is present.

[0005] The control system of the slaughterhouse or processing factory where the carcass parts are being processed can, preferably, determine which processes should be carried out for each individual carcass part and which should not. The choice of which processes should be carried out can be determined, for example, by the specific characteristics of the individual carcass part or by the required output of specific products on a certain day.

[0006] Not performing a certain process on a carcass part can be effected by guiding the carcass part to be processed past the module concerned in such a way that the carcass part does not come into contact with the processing components (such as blades or scrapers for example) of the associated module. In an advantageous variation every module can be individually switched on or off.

[0007] In this type of system the user therefore has a large degree of flexibility with regard to which processes are performed and it is also possible to introduce flexibility into the sequence

in which certain processes are performed. The flexibility with regard to the processing sequence is present in the design, set-up and adjustment to the processing line on account of the ability to select where the modules are disposed in relation to each other along the path.

[0008] EP 1 430 780 describes a method and a device for processing a carcass part of slaughtered poultry. The carcass parts to be processed comprise both bone parts and the meat that is naturally present on it. EP 1 430 780 describes various optimizations of the processing of such carcass parts, where the emphasis is largely on removing as much meat as possible from the bone parts.

[0009] A disadvantage of this approach is that the meat that is removed still often requires further trimming before it can be put into a tray in a manner that is visually attractive to the consumer.

[0010] US2243951 discloses a method for dividing a chicken into six pieces.

[0011] US2005266786 discloses a method of cutting the back of a bird which provides two boneless meat products. Three cuts are made in the back of the bird to provide generally triangularly shaped boneless meat products.

[0012] US3787926 discloses that chickens which have been eviscerated and chilled are transferred to a first handling station where they are cut in half transversely. They are then segregated into front and rear halves and transported via segregated channels to a second and a third handling station. The wings are removed at the second handling station and the legs are removed at the third handling station.

[0013] The object of the invention is to propose improved methods and devices for processing a carcass part of slaughtered poultry.

[0014] According to the invention and various aspects not according to the invention an improvement is achieved by optimizing the positioning of one or more incisions. In this way the largest possible amount of the meat desired by the consumer can be harvested in a controlled manner instead of unwanted meat and other tissue (such as fat or pieces of bone) being harvested along with the desired meat. By only harvesting the desired meat subsequent trimming is no longer necessary or is no longer necessary to the extent required with the methods and devices according to the prior art.

[0015] Further, in modern slaughterhouses a considerable proportion of the carcasses of the slaughtered poultry is split up after being made oven-ready and cooled. Products such as legs, fillets, drumsticks, wings and the like are packed separately or with a number of similar products for sale to the consumer. During packaging the way in which the product is placed in the packaging is very important; after all the product must be presented in an attractive manner. In order to achieve this much of the work in the packaging department is still often carried out manually.

[0016] The prior art has disclosed systems for automatically packing meat products. The known systems comprise a vision-system with a camera; this system determines the position and orientation of each meat product that is to be packed. This vision-system is used to control a robot with a considerable number of degrees of freedom to pick up the product and to place the product in the packaging in the manner required. The known system is complicated and expensive.

[0017] The object of the invention is to propose an improved method and an improved system for processing a carcass part of slaughtered poultry.

[0018] Various aspects not according to the invention and the invention will be described below. Each of these can be implemented using a separate device (often described as a "module" in the parlance of the skilled person), which can preferably be switched on and off. It is preferable that the control system of the slaughterhouse or the processing factory can determine for each carcass part whether the carcass part concerned should be processed by the module involved or if it should be made to bypass the module involved.

[0019] The first aspect not according to the invention proposes a method for processing a carcass part of slaughtered poultry, which carcass part comprises:

- bone parts with at least a part of the rib cage,
- at least a part of the breast fillet,
- other muscle tissue that does not form part of the breast fillet, for example at least a part of the back meat that is naturally present on the rib cage and the spine and/or at least a part of the abdominal muscle tissue,

this method comprising the following steps:

- making an incision through the meat at least up to the bone parts lying under the meat, which incision is made in an area between the breast fillet and the other muscle tissue that does not form part of the breast fillet, and which incision in that area substantially follows the shape of the breast fillet,
- detaching the breast fillet from the bone parts of the carcass part.

[0020] The first aspect not according to the invention also proposes a device for processing a carcass part of slaughtered poultry, which carcass part comprises:

- bone parts with at least a part of the rib cage,
- at least a part of the breast fillet,
- other muscle tissue that does not form part of the breast fillet, for example at least a part of the back meat that is naturally present on the rib cage and the spine and/or at least a part of the abdominal muscle tissue,

this device comprising:

- a blade for making an incision through the meat at least up to the bone parts lying under the meat, which incision is made in an area between the breast fillet and the other muscle tissue that does not form part of the breast fillet, and which incision in that area substantially follows the shape of the breast fillet,
- an actuator for realizing a relative movement between blade and carcass part, this relative movement leading to an incision that extends substantially along the contour of the breast fillet.

[0021] Making a preliminary incision between the meat that is present on the breast fillet and the other muscle tissue that is present but which is not part of the breast fillet unequivocally defines which part of the meat that is present on the carcass part will be harvested as breast fillet and which part will not. This is also as a result of the fact that the depth of the incision is chosen in such a way that it extends at least up to the bone parts of the carcass part.

[0022] A possible advantage of making the preliminary incision is that the harvested fillets no longer require subsequent manual trimming. As a result savings can be made in labour costs. In addition it is possible that a greater yield of meat can be achieved because the preliminary incision according to the invention follows the anatomy of the breast fillet more accurately than is possible on average with a manual incision during the subsequent manual trimming. The manual incision must, after all, be performed quickly and with the free hand, which does not beneficial for the accuracy. In addition, an automatic incision is uniform, unlike a manual incision. The result of this is, amongst other things, that the products, the fillets in particular, can be presented in a uniform manner.

[0023] An example of other muscle tissue that is present on the carcass part according to the invention is back meat that is naturally present on at least a part of the rib cage and the spine. It is preferable that this back meat is harvested separately from the breast fillet after the incision according to the of the invention has been made. Making a preliminary incision between the back meat that is present and the meat that is present on the breast fillet therefore unequivocally defines which part of the meat that is present on the carcass part is to be harvested as breast fillet and which part is to be harvested as back meat.

[0024] Another example of other muscle tissue is abdominal muscle tissue. Fig. 1A shows a hatched area. The muscle tissue in this hatched area is the muscle tissue that is designated as "the abdominal muscle tissue" in this application. Some also refer to the muscle tissue in the hatched area of fig. 1A as "ring muscle", despite that the muscle tissue concerned not, by definition, has to form a closed ring in the carcass part. The abdominal muscle tissue within the meaning of this application comprises at least the part of the m. obliquus externus abdominis, at least the part of the m. obliquus internus abdominis and at least the part of the m. transversus abdominis that lies within the hatched area of fig. 1A. The abdominal muscle tissue

forms a robust connection between the breast fillet and certain bone parts of the carcass part, such as the trabecula lateralis or the delta bone. The delta bone within the meaning of this application is indicated by the reference numeral 12 in fig. 1B.

[0025] In this variation of the method according to the invention the breast fillet and the abdominal muscle tissue are separated from each other by an incision which mainly follows the contour of the breast fillet and which extends at least up to the bone parts of the carcass.

[0026] Separating the breast fillet and the abdominal muscle tissue has two different possible advantages. Firstly, the abdominal muscle tissue contains a relatively high amount of fat. This fat is undesirable and it is not harvested along with the breast fillet during harvesting. Secondly, on account of the connection between the abdominal muscle tissue and the breast fillet being severed, the breast fillet is less securely attached to the bone parts of carcass part, which means that less force is required to harvest the breast fillet. The possible advantage of this is that there is less chance of the delta bone being broken while the breast fillet is being harvested and of bone splinters subsequently remaining in the harvested meat, particularly in the fillet.

[0027] In order to effect the first aspect not according to the invention it is not necessary for the incision to be made precisely along the border of the hatched area in fig. 1A and therefore all the abdominal muscle tissue falling within the hatched area of fig. 1A to be separated from the breast fillet. In practice, the incision according to the first aspect not according to the invention can also be made in any other location in the hatched area of fig. 1A. In that case part of the abdominal muscle tissue is harvested along with the breast fillet. The advantage of this is that a larger weight of meat is harvested, but the disadvantage is that there may still be bone splinters in the abdominal muscle tissue. The choice of the precise positioning of the incision in or close alongside of the hatched area in fig. 1A can be made by the user of the device and method according to the first aspect not according to the invention. It is preferable that the device according to the first aspect not according to the invention permits the precise setting of the location of the incision.

[0028] In an advantageous embodiment the carcass part to be processed comprises both at least a part of the back meat and at least a part of the abdominal muscle tissue, and an incision is made that separates the breast fillet from both the part of the back meat that is present and the part of the abdominal muscle tissue that is present.

[0029] The optimal separation between breast fillet and back meat and/or abdominal muscle tissue is achieved when the incision runs past that location on the carcass part where the wing joint would be if a wing or a part thereof were present on the carcass part on the side of the back of the carcass part.

[0030] If on the carcass part skin remains on the breast fillet and/or the back in the area of the incision, then this skin is, of course, also cut through when the incision is made. The further possible advantage of this is that, as a result of the incision, the subcutaneous peritoneum is

always removed together with the skin during the skinning. It is therefore no longer necessary to check that the peritoneum has, in fact, been removed.

[0031] Other possible advantages of making the incisions according to the first aspect not according to the invention are that the incision under the wing as described in EP1430780 A1 is no longer necessary and that the skin can be more easily removed from the breast. After all, in the known methods the skin is always torn loose from the other skin parts such as the back skin, whereas now it has already been cut loose before removal. Because the breast skin has now already been cut loose from the back skin, a defined portion of the skin is removed. Because only part of the total skin is removed in each process operation (for example, first only the breast skin and then only the back skin in a later process) less force is needed to remove the skin.

[0032] The incision can be straight, but it can also follow a curved path. The curved path can be achieved by pivoting the product carrier in relation to the blade that makes the incision in the carcass part. As an alternative the blade can also be pivoted or otherwise moved in relation to the product carrier. With a curved incision the contour of the breast fillet can be followed more accurately.

[0033] After the incision has been made, the breast fillet and possibly other usable meat, such as the back meat for example, can be removed from the bone parts of the carcass part. If the carcass part still comprises at least a part of a wing it is preferable that the breast fillet is removed from the bone parts of the carcass part by pulling on this wing part, in the manner described in EP 1430780 A1 for example. As an alternative or if the carcass part does not comprise a wing part the breast fillet can be detached from the bone parts of the carcass part by scraping.

[0034] In practice it has been found that it is favourable if the carcass part is mainly oriented in the horizontal direction while the incision is being made.

[0035] The method according to the first aspect not according to the invention can be used in combination with various types of product carriers. The type of product carrier chosen will in practice mainly be determined by the type of carcass part that is being processed. It is therefore evident for example that when processing front halves or breast caps or breast caps with short, medium or long rib a product carrier will be chosen that engages on the inside of the carcass part and that when processing carcass parts that comprise at least a part of a leg a product carrier will be chosen that engages on a leg part.

[0036] Assuming that the carcass part to be processed is a front half it is envisaged that the method according to the first aspect not according to the invention will be implemented in such a way that the incision also cuts through at least a part of bone parts of the rib cage. In this way a breast cap is cut from the carcass part and this breast cap can then be further processed later.

[0037] The first aspect not according to the invention also relates to a device for processing a carcass part of slaughtered poultry, which carcass part comprises:

- bone parts with at least a part of the rib cage,
- at least a part of the breast fillet,
- other muscle tissue that does not form part of the breast fillet, for example at least a part of the back meat that is naturally present on the rib cage and the spine and/or at least a part of the abdominal muscle tissue,

this device comprising:

- a blade for making an incision through the meat at least up to the bone parts lying under the meat, which incision is made in an area between the breast fillet and the other muscle tissue that does not form part of the breast fillet, and which incision in that area substantially follows the shape of the breast fillet,
- an actuator for realizing a relative movement between blade and carcass part, this relative movement leading to an incision that extends substantially along the contour of the breast fillet.

[0038] It is preferable that the device according to the first aspect not according to the invention comprises at least one guide that keeps any wing parts that are present on the carcass part away from the blade.

[0039] It is preferable that the device according to the first aspect not according to the invention also comprises a control element to control the pivoting of the product carrier in relation to the blade or to control the pivoting or other movement of the blade in relation to the product carrier. In this way a curved incision which closely follows the natural contour of the breast fillet can be made in an effective manner.

[0040] In relation to the invention too, a primary consideration is to ensure that the largest possible quantity of meat desired by the consumer is harvested in a controlled manner, instead of allowing unwanted meat and unwanted other tissue (such as fat or pieces of bone) to be harvested along with the desired meat. By harvesting only the desired meat subsequent trimming remains limited or is even no longer required.

[0041] The the invention achieves this object by a method for processing a carcass part of slaughtered poultry according to claim 1, which carcass part comprises:

- bone parts with at least a part of the rib cage and a part of the spine,
- at least a part of the back meat that is naturally present on the rib cage and the spine,
- at least a part of the abdominal muscle tissue,

this method comprising the following steps:

- making a first incision through the back meat near the abdominal muscle tissue at least up to the underlying bone parts of the carcass part, between the attachment of the back meat to the rib cage and the location of the neck of the carcass part, thereby severing the back meat to be harvested from the connection of the back meat from the rib cage, so that when the back meat is removed from the bone parts of the carcass part the abdominal muscle tissue remains behind on the bone parts,
- detaching the back meat from the bone parts of the carcass part.

[0042] The invention also achieves this object by a device for processing a carcass part of slaughtered poultry according to claim 9, which carcass part comprises:

- bone parts with at least a part of the rib cage and a part of the spine,
- at least a part of the back meat that is naturally present on the rib cage and the spine,
- at least a part of the abdominal muscle tissue,

this device comprising:

- a cutting device with a blade for making a first incision through the back meat next to the abdominal muscle tissue at least up to the underlying bone parts of the carcass part, between the attachment of the back meat to the rib cage and the location of the neck of the carcass part, thereby severing the back meat to be harvested from the connection of the back meat from the rib cage so that when the back meat is removed from the bone parts of the carcass part the abdominal muscle tissue remains behind on the bone parts.

[0043] The carcass part that is processed according to the invention comprises, amongst other things, the abdominal muscle tissue. Fig 1A shows a hatched area. The muscle tissue in this hatched area is the muscle tissue that is designated as "the abdominal muscle tissue" in this application. The abdominal muscle tissue within the meaning of this application comprises at least the part of the m. obliquus externus abdominis, at least the part of the m. obliquus internus abdominis and at least the part of the m. transversus abdominis that lie within the hatched area of fig. 1A. The abdominal muscle tissue forms a robust connection between the breast fillet and certain bone parts of the carcass part, such as the trabecula lateralis or the delta bone. The delta bone within the meaning of this application is indicated by the reference number 12 in fig. 1B.

[0044] The abdominal muscle tissue contains a relatively high amount of fat. Because of this it is undesirable that this muscle tissue (or a part of it) is harvested together with the back meat or the breast fillet. In addition, the abdominal muscle tissue robustly anchors the back meat to the bone parts of the carcass part, the delta bone in particular. In practice it is common that because of the abdominal muscle tissue the connection between the back meat and the delta bone is stronger than the delta bone itself and as a result the delta bone breaks when

detaching the back meat from the bone parts of the carcass. This results in bone splinters being present in the harvested back meat, which is, of course undesirable.

[0045] In the method and the device according to the invention a first incision is made through the back meat, this first incision separating the back meat and the abdominal muscle tissue from each other. In this way the the abdominal muscle tissue remains attached to the delta bone. When the back meat is removed from the bone parts of the carcass part the abdominal muscle tissue now remains behind on the bone parts. In addition it is not necessary to exert any force on the delta bone to detach the meat from the carcass parts. In this way there is no danger of the delta bone breaking under the force that is exerted on it while the meat is being detached.

[0046] Making the incision according to the invention can easily be combined with making the incision according to the first aspect not according to the invention. Two separate incisions can be made. In this way the incision according to the first aspect not according to the invention can firstly be made and then the incision according to the invention can be made. The reverse order is however also possible. It is also possible to combine these two incisions into a single incision, which preferably follows at least a part of the contour of the abdominal muscle tissue.

[0047] In practice it has been found that good results can be achieved if the incision between the abdominal muscle tissue and the back meat runs mainly perpendicular to the bone parts of the carcass part. It is even more favourable if the incision between the breast fillet and the other muscle tissue, such as the back meat and/or the abdominal muscle tissue for example, runs mainly perpendicular to the bone parts of the carcass part.

[0048] It is preferable that the incision between the abdominal muscle tissue and the back meat runs closely above the attachment of the back meat to the underside of the rib cage. "Above" and "below" in this context relate to the natural posture of live poultry. The incision is therefore on the same side of the connection of the back meat to the rib cage as where the head sits on live poultry.

[0049] It is preferable that the incision between back meat and abdominal muscle tissue and/or the incision between the back meat and the breast fillet follows the contour of the abdominal muscle tissue as closely as possible. In this manner the largest amount possible of desired meat can be harvested.

[0050] The invention also relates to a device for processing a carcass part of slaughtered poultry, which carcass part comprises:

- bone parts with at least a part of the rib cage and a part of the spine,
- at least a part of the back meat that is naturally present on the rib cage and the spine,
- at least a part of the abdominal muscle tissue,

this device comprising:

- a cutting device with a blade for making a first incision through the back meat next to the abdominal muscle tissue at least up to the underlying bone parts of the carcass part, between the attachment of the back meat to the rib cage and the location of the neck of the carcass part, thereby severing the back meat to be harvested from the connection of the back meat from the rib cage so that when the back meat is removed from the bone parts of the carcass part the abdominal muscle tissue remains behind on the bone parts.

[0051] In this device a blade is provided to make an incision through the back meat at least up to the bone parts of the carcass part, which incision separates the abdominal muscle tissue from the back meat in such a way that the abdominal muscle tissue remains attached to the delta bone.

[0052] This blade can also be used to make the incision between the breast fillet and other muscle tissue, such as the incision between the breast fillet and the back meat and/or the incision between the breast fillet and the abdominal muscle tissue. This incision can, however, also be made using another blade.

[0053] The blade can be designed in the form of a rotating blade, but it is equally possible to use a static blade.

[0054] A second aspect not according to the invention is directed to an improvement in detaching the back meat.

[0055] According to the second aspect not according to the invention this is achieved by a method for processing a carcass part of slaughtered poultry, which carcass part comprises:

- bone parts with at least a part of the back of the rib cage and the spine,
- at least a part of the back meat that is naturally present on the back of the rib cage and the spine,

this method comprising the following steps:

- making two incisions on the back side of the carcass part, which incisions extend on either side of the spine and which incisions separate the back meat from the spine on either side of the spine,
- detaching at least a part of the back meat that is naturally present on the carcass part using a scraper, which scraper has a cutting edge with a curved shape in a plane that substantially extends perpendicular to the direction of the spine, which curved shape substantially matches the side of the back of the contour of the bone parts of the carcass part from which the back meat must be detached, as seen in the direction of the spine, which cutting edge is sharp so that the connection between the back meat and the bone parts of the carcass part is cut through, in which detachment of the back meat by the scraper starts from the incisions along the spine, and in which the carcass part and the

scraper move relative to each other while the meat is being detached.

[0056] According to the second aspect not according to the invention this is also achieved by a device for processing a carcass part of slaughtered poultry, which carcass part comprises:

- at least a part of the back,
- at least a part of the meat that is naturally present on the back,

this device comprising:

- a guide for guiding and positioning the carcass part to be processed in relation to the device,
- at least one blade for making two incisions on the back side of the carcass part, which incisions extend on each side of the spine and which incisions separate the back meat from the spine on either side of the spine,
- a scraper for detaching at least a part of the back meat that is present on the carcass part, which scraper has a cutting edge with a curved shape in a plane that extends substantially perpendicular to the direction in which the spine extends, which curved shape matches substantially the side of the back of the contour of the bone parts of the carcass part from which the back meat must be detached, as seen in the direction of the spine, which cutting edge is sharp and directly adjacent to the blade in such a way that the detaching of the back meat by the scraper starts from the incision along the spine.

[0057] When the carcass part enters the device according to the second aspect not according to the invention the back of the carcass part is guided and positioned by a guide. In a preferred embodiment this guide comprises two mainly parallel plates that are positioned a short distance from each other. These plates extend mainly in the conveying direction of the carcass parts.

[0058] When the back of the carcass part has been positioned the connection of the back meat to the bone parts of the carcass part is broken on either side of the spine. This can be achieved using rotating blades or static blades. It is preferable that two rotating blades mounted next to each other are used which, in a preferred embodiment, extend into the space between the parallel plates of the guide.

[0059] Next, the back meat is at least partly scraped loose from the bone parts of the carcass part. This is done by a relative movement of the carcass part along a scraper. The scraper can have a mainly stationary mounting. In that case a product carrier advances the carcass part along the scraper. The other way around, the scraper can also move and the product carrier can mainly hold the carcass part to be processed still. In addition, a combination of a movement of the carcass part to be processed and a movement of the scraper is possible.

[0060] The scraper has a hollow shape, of which the internal shape mainly matches the outer contour of the back side of the system of bone parts of a carcass part to be processed. In addition, the scraper, as seen in the conveying direction of the carcass parts, has a cutting edge that rises on each side. This edge is on the front of the scraper, as seen in the conveying direction of the carcass parts, and is therefore the first part of the scraper that each carcass part comes into contact with. It is preferable that the cutting edge has a curved shape.

[0061] By using a sharp scraping edge it is no longer necessary to use a separate blade to start detaching the back meat, as in the devices and methods that have been disclosed by the prior art. The cutting edge severs the initially robust connection between the back meat and the bone parts of the carcass part.

[0062] The scraper is arranged in such a way that the cutting edge is directly adjacent to the blades that sever the origin of the back meat on both sides of the spine. As a result the cutting edge of the scraper inserts into the incisions that have been made by the blades concerned. A right positioning of the scraper in relation to the blades can be achieved by a resilient arrangement of the scraper. If rotating blades are used for severing the connection between the back meat and the spine the scraper can, preferably, move resiliently around an axis that coincides with the rotation axis of the rotating blades.

[0063] It is preferable that the scraper comprises at least one recess that ensures that the wing joint can pass the scraper without being damaged.

[0064] It is preferable that the carcass part is supported on the scraper during scraping.

[0065] It is preferable that the scraper comprises two scraper members formed as mirror images of each other. It is more preferable that the scraper members can move transverse to the conveying direction of the carcass part. The advantages of this are that by controlling a movement in the transverse direction the shape of the bone parts of the carcass part can be better followed and that the scraper can be switched on and off.

[0066] It is preferable that the scraper has such a shape that the back meat that is scraped loose is moved away from the bone parts of the carcass part.

[0067] It is preferable that in the device according to the second aspect not according to the invention the carcass part to be processed is guided into the device in such a manner that during processing of the carcass part the spine lies mainly in the conveying direction and the back is directed downwardly.

[0068] Following the performing of the method according to the second aspect not according to the invention, the back meat may have been fully detached from the bone parts of the carcass part, but it is also possible that there is still a connection between the back meat and the bone parts of the carcass part. This is particularly advantageous when the method

according to the second aspect not according to the invention is used in preparation for the method according to the third aspect not according to the invention which will be explained further below.

[0069] A third aspect not according to the invention is directed to an improvement in harvesting back meat.

[0070] According to the third aspect not according to the invention this is achieved with a method for processing a carcass part of slaughtered poultry, which carcass part comprises:

- bone parts with at least a part of the back of the rib cage and the spine,
- at least a part of the meat that is naturally present on the back of the rib cage and the spine,

this method comprising the following steps:

- detaching a part of the back meat from the underlying bone parts of the carcass part,
- engaging at least a part of the detached back meat, and then peeling the back meat off the bone parts of the carcass part.

[0071] According to the third aspect not according to the invention this is also achieved with a device for processing a carcass part of slaughtered poultry, which carcass part comprises:

- bone parts with at least a part of the back of the rib cage and the spine,
- at least a part of the back meat that is naturally present on the back of the rib cage and the spine, which back meat has been partly detached from the bone parts of the carcass part,

this device comprising:

- a gripper for engaging on at least a part of the previously detached back meat, and
- a peeler for peeling the back meat off the bone parts of the carcass.

[0072] According to the prior art the back meat is harvested from the bone parts of a carcass part in a bone press. The disadvantage of this is that the high-quality structure of the back meat is almost entirely lost. Considering the demand for high-quality meat, harvesting the back meat using a bone press is unfavourable. In addition, a higher price can be demanded for unpressed meat which increases the return per processed carcass part.

[0073] Peeling the back meat off the carcass retains the relative high-quality structure of the back meat. In addition, the device according to the third aspect not according to the invention is smaller, simpler and cheaper than the known devices for removing back meat from a

carcass part.

[0074] The meaning of "peeling off" is as follows: initially the back meat is attached to the bone parts of the carcass part across a considerable part of the surface. There is therefore a connecting surface between the back meat and the bone parts of the carcass part. At a part of the back meat the connection with the bone parts of the carcass part has, however, already been severed, by scraping for instance. This loose-hanging meat is then gripped after which a peeling force is exerted on this loose meat. This peeling force works on the connection between the still attached back meat and the underlying bone parts of the carcass part via the loose meat. By applying the peeling force the back meat is gradually detached from the bone parts of the carcass part instead of being detached with more or less a single pull as in the prior art. As a result the back meat remains largely intact. In comparison with the known method and the known device the back meat detached according to the invention is more intact at the location of the connecting surface with the bone parts of the carcass part.

[0075] In practice it has been found that peeling off the back meat can be achieved in an effective manner by having at least two rollers, each of which is provided with a profile on the outside, engage the part of the back meat that has already been detached. These rollers then hold the meat securely and also peel the meat off the bone parts of the carcass part.

[0076] The profile on the rollers can be helical. The helix can be formed by a continuous, raised edge or by projections which stand some distance from each other being positioned along a helical line.

[0077] The most effective peeling of the back meat is achieved if the carcass part is moved in relation to the rollers, particularly if the carcass part moves mainly in the axial direction of the rollers. Apart from that, it is possible to achieve effective peeling of the meat by moving the carcass part mainly in the direction of the spine, whereby the axial direction of the rollers encloses an acute angle with the conveying direction of the carcass parts.

[0078] Preferably, the helical profile of the rollers chosen is such that during peeling-off the rollers move the back meat in a direction that is opposite to the conveying direction.

[0079] It is preferable that there is some space between the rollers so that the carcass part can be moved between the rollers, allowing the rollers to engage more on the sides of the carcass part. The existence of the space between the rollers has the important advantage that the back meat is not crushed between the rollers but retains its original, high-quality structure.

[0080] It is advantageous if the part of the back meat that has already been detached from the bone parts of the carcass hangs free of the bone parts of the carcass part when the gripper engages on the back meat. In this way the gripper can more easily grasp the back meat.

[0081] It is preferable that the carcass part is fed into the device according to the third aspect not according to the invention in a position in which the back is turned downwards. In this way

gravity pulls the previously detached parts of the back meat downwards.

[0082] It is preferable that the carcass part can also pivot, preferably around an axis that extends mainly perpendicular to the carcass part's plane of symmetry while the back meat is peeled off. In this way the direction of the force with which the back meat is unwound is adapted to the anatomy of the carcass part.

[0083] The method and the device according to the third aspect not according to the invention can easily be combined with the use of a product carrier that engages on the inside of the carcass part.

[0084] It is preferable that the rollers are mounted mainly parallel. This produces the best results in practice. In addition it is preferable that the rollers are resiliently mounted.

[0085] In an advantageous embodiment engaging and peeling is achieved by a combination of four rollers. It is preferable that these rollers are positioned in relation to each other in such a manner that, as seen in the axial direction of the rollers, they approximate the contour of the carcass part to be processed as seen in the direction of the spine. This will ensure secure engagement and peeling.

[0086] Devices and methods according to the invention and various aspects not according to the invention will be explained in more detail below with reference to the appended drawing, which, without implying any restriction, shows exemplary embodiments.

[0087] The drawing shows in:

fig. 1 an example of a carcass part with an incision according to the first aspect not according to the invention,

fig. 1A an overview of the anatomy of a carcass part indicating the abdominal muscle tissue,

fig. 1B an overview of the anatomy of a carcass part indicating the delta bone,

fig. 1C a product carrier with a front half on it,

fig. 1D and 1E the arranging of a breast cap on the product carrier,

fig. 1F an alternative product carrier,

fig. 1G the alternative product carrier of fig. 1F with a breast cap with wings as the carcass part to be processed,

fig. 1H the alternative product carrier of fig. 1F with a breast cap without wings as the carcass part to be processed,

fig. 2 a first example of a part of a method and device according to the first aspect not according to the invention,

fig. 3 a second exemplary embodiment of a part of the method and the device according to the first aspect not according to the invention,

fig. 4 a part of the device according to fig. 3,

fig. 5 a diagrammatical depiction of a carcass part,

fig. 6 a first stage of the method according to the invention in a device according to the invention,

fig. 7 a second stage of the method according to the invention in a device according to the invention,

fig. 8 possible embodiments of incisions into a carcass part of slaughtered poultry,

fig. 9 a part of a first embodiment of the method and device according to the third aspect not according to the invention, in a first stage of the method according to the third aspect not according to the invention,

fig. 10 a part of a first embodiment of the method and device according to the third aspect not according to the invention, in a second stage of the method according to the third aspect not according to the invention,

fig. 11 a part of a first embodiment of the method and device according to the third aspect not according to the invention, in a third stage of the method according to the third aspect not according to the invention,

fig. 12 diagrammatically, peeling off the back meat from the back of the carcass part,

fig. 13 a first stage of a second embodiment of the method according to the third aspect not according to the invention,

fig. 14 a second stage of a second embodiment of the method according to the third aspect not according to the invention,

fig. 15 a part of a variation of the method and device according to the third aspect not according to the invention,

fig. 16 a part of a variation of the method and device according to the third aspect not according to the invention, in a somewhat later stage of the method according to the third aspect not according to the invention,

fig. 17 an overview of a device according to the second aspect not according to the invention,

fig. 18 the device of fig.17, during execution of a first phase of the method according to the second aspect not according to the invention,

fig. 19 a cross section of the situation of fig. 18,

fig. 20 the device of fig. 17 during execution of a second phase of the method according to the second aspect not according to the invention,

fig. 21 the device of fig. 17 during execution of a third phase of the method according to the second aspect not according to the invention,

fig. 22 a cross section of the situation of fig. 21,

fig. 23 a scraper member according to a preferred embodiment of the second aspect not according to the invention in perspective elevation, fig. 24 a side view of the scraper member according to fig. 23,

[0088] Fig. 1 shows an example of a carcass part 1 with an incision 110 according to the first aspect not according to the invention. This carcass part 1 of slaughtered poultry comprises at least a part of the back 2. Not shown in fig. 1, but present in the carcass part 1 in this example, are at least a part of the rib cage and a part of the spine. Fig. 1 shows that the carcass part 1 comprises at least a part of the meat that is naturally present on the back 2 and on the rib cage. The meat on the rib cage comprises at least a part of the meat on the breast 3, that is: at least a part of the breast fillet 8.

[0089] The carcass part 1 to be processed in the example in fig. 1 is a front half. It is however also possible to process other types of carcass parts, such as breast caps for example, using the device and method according to the first aspect not according to the invention.

[0090] Fig 1A and fig. 1B show the anatomy of the torso of poultry. The hatched part in fig. 1A shows the area in which the abdominal muscle tissue 11 lies. In some circles the muscle tissue in the hatched area in fig 1A is known in professional parlance as "ring muscle". The abdominal muscle tissue comprises at least the part of the m. obliquus externus abdominis, at least the part of the m. obliquus internus abdominis and at least the part of the m. transversus abdominis that fall within the hatched area of fig. 1A. fig. 1B shows the position of the delta bone 12.

[0091] Fig. 1A and fig 1B are based on figures from the book "Atlas de anatomia de las aves domésticas" [Atlas of the anatomy of domestic birds], ISBN 84-283-1138-2, published in 1981. The Latin names of the muscles shown in the figures have been included in a separate list that is appended to this application.

[0092] In the example shown in fig. 1 the carcass part 1 also comprises both wings or least parts 4 of them. This is not, however, a requirement in order to implement the method according to the first aspect not according to the invention.

[0093] Fig. 1C shows a product carrier 50 with a front half that has been placed onto it. The product carrier 50 shown in fig. 1C can pivot around axis 51 and around axis 52. A product

carrier of this type is suitable for use in combination with the invention and all aspects not according to the invention that are described in this application. It is not, however, necessary to use a product carrier capable of this type of pivoting. In most cases the processing operations that are described in this application require a relative movement between the carcass part 1 to be processed and the parts of the device that directly engage on the carcass part 1 such as blades or scrapers for example. The desired relative movement can be achieved by having the product carrier that is holding the carcass part 1 move while having the processing components of the device remain in a mainly fixed position (naturally this is apart from any resilient moving of certain components and rotation of the rotating blades), but of course also by holding the carcass part 1 in a mainly fixed position while the processing components. Naturally, a combination of a movement of the carcass part 1 and a movement of the processing components of the device according to the invention and the various aspects not according to the invention is possible in order to achieve the desired relative movement between the carcass part and the device.

[0094] Fig. 1D and fig. 1E show a breast cap being attached to the product carrier 50. The product carrier 50 in fig. 1D and fig. 1E is of the same type as shown in fig. 1C. The product carrier is provided with a hook 53 that holds the breast cap securely on the product carrier 50. Naturally, a type of product carrier that does not have the pivoting capability of the product carrier shown can also be used when processing a breast cap.

[0095] Fig. 1F shows a side view of an example of an alternative product carrier 50*. In this example the product carrier 50* is based on the product carrier that is known from EP0254332. This product carrier is only rotatable according to arrow 52*. This rotation can be controlled by control elements that engage toothed wheel 54*. Product carrier 50* is moveable along path 53* in conveying direction T1. Each of the product carriers 50* is connected to a trolley 55* that can be guided across a profile 56*. The trolleys 55* are mutually connected by a (diagrammatically depicted) chain or cable 57*.

[0096] Fig. 1G shows the alternative product carrier of fig. 1F provided with a breast cap with wings as the carcass part 1 to be processed. Fig. 1H shows the alternative product carrier of fig. 1F provided with a breast cap without wings as the carcass part 1 to be processed. Processing of breast caps with or without wings can also take place using a product carrier 50 of the type as shown in figures 1C, 1D and 1E. The otherway around the product carrier 50* shown in figures 1F, 1G and 1H can also be used for processing front halves with wings, front halves without wings and the like, for example.

[0097] In the method according to the first aspect not according to the invention an incision 110 is made through the meat that is present on the carcass part 1. This incision 110 extends substantially along the contour of the breast fillet 8 in the region between the back meat 15 and the breast fillet 8 and in the region between the abdominal muscle tissue 11 and the breast fillet 8. The depth of the incision is chosen such that the meat is cut into up to the bone parts of the carcass part (that comprises at least a part of the rib cage). As can be seen in fig. 1, the incision runs on the side of the back along the region where the wing parts 4 are connected to

the rest of the carcass part 1.

[0098] In an alternative embodiment, not shown, the incision 110 separates the breast fillet from the abdominal muscle tissue but not from the back meat. This embodiment uses the advantages of separating the abdominal muscle tissue and the back meat, while it still remains possible to harvest the back meat and the breast fillet as an integral piece of meat, using the method described in EP 1430780 for example.

[0099] Fig. 1 shows an incision 110 with a curved path. In this way the incision follows the anatomical shape of the breast fillet 8 relatively accurately. It is however also possible for the incision 110 to be straight. The shape of the breast fillet 8 is then still substantially followed.

[0100] Fig 5. too shows a possible location for incision 110. With the location of incision 110 as shown in fig. 5 the abdominal muscle tissue is fully separated from the breast fillet. It is however also possible for the user of the device and/or method according to the first aspect not according to the invention to decide to move the incision 110 slightly upwards, in the direction of arrow Y, resulting in incision 110* for instance.

[0101] Fig. 2 shows a first example of a part of a method and device according to the first aspect not according to the invention. In this exemplary embodiment the carcass parts 1 (for example, front halves as shown, or breast caps; front halves and breast caps with or without wings) are held by the product carriers 50 that engage on the inside of the carcass parts 1. The product carriers 50 move the carcass parts 1 along a predetermined path in a conveying direction T1. It is preferable that a number of processing devices are disposed along the path, each of which performs a process on the passing carcass parts 1.

[0102] In the exemplary embodiment shown in fig. 2 the carcass parts 1 are cooled before they undergo the method according to the first aspect not according to the invention. Here it is advantageous if the carcass part 1 still also comprises wing parts 4, that the wings are stretched prior to processing in accordance with the method according to the first aspect not according to the invention. The advantage of this is that the position of the wing parts 4 is more or less known and they are not in the way while the processing operations according to the first aspect not according to the invention and, where appropriate, the invention and/or the further aspects not according to the invention are being carried out. A wing stretcher fitted with plucking fingers, known per se, can be used to stretch the wing parts. Guides for the wings can be used as an alternative or an addition.

[0103] The part of the device according to the first aspect not according to the invention that is shown in fig. 2 comprises two rotating blades 101, each of which is circular (disc-shaped) and each of which is rotatable around its centre point on an associated shaft 104. Each blade 101 is driven by an associated motor 103. The rotating blades 101 are disposed on either side of space 105, in which the device shown in fig. 2 receives the product carriers 50 that securely hold a carcass part 1. Thus, the rotating blades 101 form the blade of the device.

[0104] Fig. 2 further shows the presence of guides 102, which preferably keep the wing parts 4 that have preferably been stretched before, outside of the reach of the rotating blades 101. In the example of fig. 2 the carcass parts 1 are advanced through the device shown in fig. 2 with the back 2 directed upward. Here the spine or the part of it that is present is oriented more or less horizontally, that is the direction of the spine or the part of the spine that is still present has a clear and purposely imposed deviation from the vertical. It is also possible that the carcass part 1 to be processed no longer has a spine, because the carcass part 1 to be processed is a breast cap for example. In this case the carcass part is oriented in such a way that the carcass part to be processed is oriented such that if a spine had still been present this spine would have a clear and purposely imposed deviation from the vertical.

[0105] The blades 101 cut up to the bone parts of the carcass part 1. Where product carriers 50 are used which engage on the inside of the carcass part 1, the result is that the blades 101 approach the product carriers 50 to a few millimetres. It is therefore also an advantage if the product carrier 50 is stable and displays little vibration or other uncontrolled movements. The product carrier that is known from EP1191852 in practice appears to be satisfactory. In addition, it is preferable that the position of each blade 101 is adjustable. In this way the variations in the average size of the carcass parts 1 between the various flocks to be slaughtered can be accommodated. Also, by adjusting the blades 101 the yield from the processing can be influenced and the position of the incision 110 in relation to the breast fillet can be determined. The blades can be adjusted in such a way that the incision 110 is next to the hatched area shown in fig. 1A or runs through this area. The adjustment can be achieved by shifting the combination of the blade 101 and the associated motor 103 in relation to the path.

[0106] It is advantageous if the guides 102 are mounted resiliently. When the wing parts 4 are pushed away, downwards in the example shown in fig. 2, the guides 102 then also push away all play in the product carrier 50 in the same direction. This means that the product carrier is more stable and there is less risk of the rotating blades 101 damaging the product carrier 50.

[0107] In an advantageous variation, not shown, each of the guides 102 is split into a first and a second part. The split between the first and the second part, as seen in the conveying direction T1, lies in upstream of the blades 101. It is preferable that the second part of each guide is then connected to the suspension on the motors 103. In this way it is easier to access the blades 101 and the associated motors 103 for maintenance work.

[0108] As shown in fig. 2 the incision 110 can have a curved path. This can be achieved in a favourable manner in the structural design by arranging the rotating blades 101 in a pivotable way. The ability of the rotating blades to pivot relative to the product carriers 50 is shown in fig. 2 by the arrows R2. The combination of the pivoting R2 of the rotating blades 101 and the conveyance of the carcass parts 1 by the product carriers 50 in direction T1 provides the desired curvature of the incision 110. Instead of the rotating blades 101 having a pivotable arrangement the product carriers 50 can also be pivotable like the product carrier known from EP1191852 for example. To this end, the product carriers are provided with a rotation axis 51.

In this variation the rotating blades 101 can have a fixed mounting. The product carriers 50 then pivot the carcass parts 1 in direction R3 relative to the fixedly arranged rotating blades 101. It is also possible that both the rotating blades 101 and the product carrier 50 are pivotable.

[0109] It is preferable that the device as shown in fig. 2 also comprises a device for removing the breast fillet 8 from the bone parts of the carcass part 1. This filleting device will be disposed downstream, as seen in the conveying direction T1, of the part of the device according to the invention that is shown in fig. 2. The filleting device will then, on account of the conveying direction T1 of the product carriers 50 with the carcass parts 1, only become active after the incision 110 has been made by the rotating blades 101. The filleting device can have an operating principle that is based on scraping the breast fillet 8 loose from the bone parts of the carcass. As an alternative a filleting device as described in EP 1430780 A1 can also be used. This filleting device engages on the wing parts 4 that are present and exerts a tensile force on them. In this way the wing parts 4 are pulled off the bone parts of the carcass part, in particular from the rib cage, together with the breast fillet 8.

[0110] Fig. 3 shows a second exemplary embodiment of a part of the method and the device according to the first aspect not according to the invention. In this exemplary embodiment the carcass part also still comprises the leg parts 5 in addition to the parts that have already been described in relation to fig. 2. In the example shown in fig. 3 the product carrier 50 engages on these leg parts 5. The product carriers 50 convey the carcass parts 1 in the main conveying direction T1.

[0111] The device as shown in fig. 3 once again comprises a space 105 for receiving the carcass parts 1. When entering the device shown in fig. 3, the back 2 of the carcass part comes into contact with the support 107. In the example in fig. 3 support 107 is a revolving conveyor belt. The support ensures that the spine or the part of the spine that is present in the carcass part 1 comes to lie substantially horizontally. The product carrier 50 advances the carcass part 1 to the rotating blades 101, which are disposed on either side of the space 105. The rotating blades make the incision 110. In this example too there is an incision 110 which also extends along the back meat and along the abdominal muscle tissue (as seen in the longitudinal direction of the abdominal muscle tissue) so that the breast fillet on the one hand and the back meat and abdominal muscle tissue on the other hand are separated from each other. Guides 102 ensure that the wing parts 4 that are present do not come within reach of the rotating blades 101.

[0112] Fig. 4 shows a part of the device shown in fig. 3. In fig. 4 the incision 110 which has been made by the rotating blades 101 can be seen.

[0113] Figs. 3 and 4 clearly show that the carcass part 1 is now processed in a position whereby the breast is directed upwards. This is contrary to the embodiment shown in fig. 2.

[0114] As well as the device and the method shown in fig. 2 it is preferable for the device and

method as shown in figs. 3 and 4 to also comprise a filleting device. This filleting device is intended to detach the breast fillet 8 from the carcass part 1, either with or without simultaneous removal of the wing parts 4. The filleting device can detach the breast fillet 8 by scraping, or by pulling on the wing parts 4, as described in relation to fig. 2.

[0115] It is generally advantageous if the device according to the first aspect not according to the invention can be switched on and off for each passing carcass part 1. To this end the device is provided with a product detector 108. The product detector 108 detects whether there is a carcass part 1 on the product carrier 50 or whether the product carrier 50 is empty. Detection can take place in a number of ways, optically or mechanically for example. In the latter case for example a guide is pressed down by a passing carcass part 1, but not by an empty product carrier 50 passing by. The product detector 108 then detects whether or not the guide has been pressed down. If a carcass part 1 is detected the device according to the first aspect not according to the invention becomes active and the incision 110 is made. This can be done either by sending the blades 101 out to the carcass part for example or by having the product carrier 50 advance the carcass part 1 within range of the blades. If no carcass part 1 is detected, however, the blades 101 and the product carrier 50 are kept away from each other. The advantage of this is that the blades 101 cannot damage the empty product carrier 50 that is passing by.

[0116] The device and the method according to the first aspect not according to the invention, and therefore also the devices and the methods as shown in figs. 2, 3 and 4 also, can also be used for cutting a breast cap out of a front half. To this end the incision 110 is made so deep that the incision 110 also cuts through a part of the bone parts of the rib cage. This creates a breast cap, in which account is taken of the anatomy of the slaughtered poultry. The breast cap that is obtained in this way comprises no, or hardly any, meat that is not desired by the consumer.

[0117] The first aspect not according to the invention involves a method for processing a carcass part of slaughtered poultry, which carcass part comprises:

- bone parts with at least a part of the rib cage,
- at least a part of the breast fillet,
- other muscle tissue that does not form part of the breast fillet, for example at least a part of the back meat that is naturally present on the rib cage and the spine and/or at least a part of the abdominal muscle tissue,

this method comprising the following steps:

- making an incision through the meat at least up to the bone parts lying under the meat, which incision is made in an area between the breast fillet and the other muscle tissue that does not form part of the breast fillet, and which incision in that area substantially follows the shape of the breast fillet,
- detaching the breast fillet from the bone parts of the carcass part.

[0118] In a preferred embodiment of the method according to the first aspect not according to the invention, the carcass part comprises at least a part of the abdominal muscle tissue and at least a part of the back meat that is naturally present on the rib cage and the spine, and in method which the incision extends between the abdominal muscle tissue and the breast fillet and between the back meat and the breast fillet.

[0119] In a preferred embodiment of the method according to the first aspect not according to the invention, the incision runs on the side of the back past that location on the carcass part where the wing joint would be if a wing or a part thereof were present on the carcass part.

[0120] In a preferred embodiment of the method according to the first aspect not according to the invention, the incision has a curved path, and preferably:

- a product carrier supports the carcass part and
- the incision is made by a blade of a cutting device and
- the curvature of the incision is achieved by a relative movement of the product carrier and the blade.

[0121] In a preferred embodiment of the method according to the first aspect not according to the invention, the breast fillet is detached from the bone parts by scraping, or the carcass part further comprises at least a part of a wing and the breast fillet is detached from the bone parts of the carcass part by pulling on the wing.

[0122] In a preferred embodiment of the method according to the first aspect not according to the invention, the direction of the spine in the carcass part or the direction of the spine if it had been present in the carcass part is substantially oriented in the horizontal direction while the incision is being made.

[0123] In a preferred embodiment of the method according to the first aspect not according to the invention, a product carrier supports the carcass part and the product carrier engages on the inside of the carcass part, or the carcass part further comprises at least a part of at least a leg and the product carrier engages on the leg part and in this way supports the carcass part.

[0124] In a preferred embodiment of the method according to the first aspect not according to the invention, the incision also cuts through at least a part of bone parts of the rib cage.

[0125] The first aspect not according to the invention also involves a device for processing a carcass part of slaughtered poultry, which carcass part comprises:

- bone parts with at least a part of the rib cage,
- at least a part of the breast fillet,
- other muscle tissue that does not form part of the breast fillet, for example at least a part

of the back meat that is naturally present on the rib cage and the spine and/or at least a part of the abdominal muscle tissue,

this device comprising:

- a blade for making an incision through the meat at least up to the bone parts lying under the meat, which incision is made in an area between the breast fillet and the other muscle tissue that does not form part of the breast fillet, and which incision in that area substantially follows the shape of the breast fillet,
- an actuator for realizing a relative movement between blade and carcass part, this relative movement leading to an incision that extends substantially along the contour of the breast fillet.

[0126] In a preferred embodiment of the device according to the first aspect not according to the invention,

the device also comprises at least one wing guide for keeping any wing parts present on the carcass part away from the blade.

[0127] In a preferred embodiment of the device according to the first aspect not according to the invention, the device also comprises:

- a product carrier for supporting a carcass part to be processed, this product carrier pivotable around one or more axes,
- a control element for controlling the pivoting of the product carrier relative to the blade.

[0128] In a preferred embodiment of the device according to the first aspect not according to the invention, the device also comprises a filleting device for detaching the breast fillet from the bone parts of the carcass.

[0129] In a preferred embodiment of the device according to the first aspect not according to the invention, the filleting device comprises at least a scraper member.

[0130] In a preferred embodiment of the device according to the first aspect not according to the invention, the carcass part to be processed comprises at least a wing part and the filleting device is adapted to engage a wing part and to detach the breast fillet from the bone parts of the carcass part by exerting a tensile force on one or more wing parts.

[0131] In a preferred embodiment of the device according to the first aspect not according to the invention, the blade is adapted to also cut through at least a part of the bone parts of the rib cage.

[0132] Fig. 5 shows a carcass part 1, that comprises: bone parts with at least a part of the rib

cage and a part of the spine, at least a part of the back meat that is naturally present on the rib cage and the spine, and at least a part of the abdominal muscle tissue. In the example shown the carcass part 1 is a front half with wing parts 4. On the carcass part 1 there is at least a part of the breast fillet 8 and a part of the back meat 15 present. For the location of the abdominal muscle tissue 11 and that of the delta bone 12, referral is made to fig. 1A and fig. 1B.

[0133] Fig. 5 diagrammatically indicates the position of incision 110 and that of an incision 210 according to the invention. Incision 110* indicates an alternative to incision 110. If incision 110* is used then incision 210 is preferably limited by incision 110*. The location of incision 210 will be explained in more detail below. Fig. 5 shows an incision 110 that separates the breast fillet 8 from the back meat 15 and from the abdominal muscle tissue 11.

[0134] Figs. 6 and 7 show a method and device according to the invention. In the example shown a carcass part 1 is held by a product carrier 50. This product carrier 50 conveys the carcass part in a conveying direction T1 relative to the device according to the invention.

[0135] In the example in figs. 6 and 7 an incision 110 according to the invention has already been made in the carcass part 1 according to the first aspect not according to the invention. This is an advantage but it is not a requirement for implementing a method. In this example incision 110 separates the breast fillet from both the back meat and from the abdominal muscle tissue. This is not however a requirement for combining the first aspect not according to the invention with the invention.

[0136] The device according to the invention comprises in the exemplary embodiment shown in figs. 6 and 7 a space 205 for receiving the carcass part 1. Two rotating blades 201 are arranged on either side of this space 205. These two rotating blades make an incision 210 in the carcass part up to the bone parts of the carcass part. This incision separates the abdominal muscle tissue 11 from the back meat 15 in such a way that the abdominal muscle tissue 11 remains attached to the delta bone 12. The device shown in figs. 6 and 7 further comprises guides 202 that ensure that the wing parts 4 remain out of reach of the rotating blades 201. There is also a guide 206 present in this example. This ensures that the carcass part is centred relative to the rotating blades 201.

[0137] In an alternative embodiment, not shown, the carcass part 1 to be processed is stationary and the blades 201 move along the carcass part 1 to be processed.

[0138] At least one of the guides can be provided with a product detector 208. In the example shown in fig. 6 this is the centring guide 206. This guide 206 is resiliently mounted, for example, by means of a compression spring which ensures that the guide 206 can move in the vertical direction. When a product carrier 50 with a carcass part 1 attached passes by, the guide 206 is displaced somewhat in the vertical direction. This displacement is detected by the product detector which generates a signal that a carcass part 1 is present on the product carrier 50. However, should an empty product carrier 50 pass by, the guide 206 is not pushed away vertically. In order to prevent an empty product carrier 50 being damaged by the rotating

blades 201 the product carrier and the blades 201 are, in this case, kept away from each other, by rotating the product carrier 50 away around rotation axis 51 for example so that the product carrier advances above the blades 201 instead of between them. As an alternative the product detector can also be an optical sensor that directly detects the presence of a carcass part on the carrier 50, or that detects the vertical displacement of guide 206.

[0139] As in the first aspect not according to the invention, the blades 201 cut up to the bone parts of the carcass part 1. Where product carriers 50 are used which engage on the inside of the carcass part 1, the result is that the blades 101 approach the product carriers 50 as close as a few millimetres. It is therefore also advantageous if the product carrier 50 is stable and displays little vibration or other uncontrolled movements. In practice the known product carrier that is described in EP1191852 appears to perform satisfactory.

[0140] Further, it is preferable that the position of each blade 201 is adjustable. In this way the variations in the average size of the carcass parts 1 between the various flocks to be slaughtered can be accommodated. Also by adjusting the blades 201 the yield of the final removal of the meat can be influenced.

[0141] It is advantageous if the guides 202 are mounted resiliently. When the wing parts 4 are pushed away, downwards in the examples shown in figs. 6 and 7, the guides 202 then also push away all play from the product carrier 50 in the same direction. This means that the product carrier is more stable and there is less risk of the rotating blades 201 damaging the product carrier 50.

[0142] Instead of being carried out by one or more rotating blades 201 the incising operation for separating the back meat 15 and the abdominal muscle tissue 11 can also be performed by one or more static blades.

[0143] In the example shown in figs. 6 and 7 the incision 210 is made in such a way that it runs substantially perpendicular to the bone parts of the carcass part. In the example the incision 210 runs in the immediate vicinity of the connection of the back meat 15 to the rib cage. Of course, the incision then lies so that the back meat 15 to be harvested is severed from this connection. In practice this means that the incision lies between the attachment of the back meat 15 to the rib cage and the location of the neck of the carcass part 1.

[0144] It is advantageous if the incision is shaped such that the incision 210 follows the contour of the abdominal muscle tissue 11 as closely as possible. In this way the greatest possible amount of desired back meat 15 can be harvested. Making a curved incision, which takes as much account as possible of the anatomy of the carcass part of the slaughtered poultry, can be achieved by a relative pivoting of the blade 201 and the carcass part 1. This can be achieved by a pivotable arrangement of the blade 201 or by using a product carrier 50 that is pivotable around pivot axis 51. A combination of both is also possible.

[0145] Figs. 8a and 8b show possible embodiments of incisions in a carcass part of

slaughtered poultry. Fig. 8a shows a combination of the first aspect not according to the invention and the invention. In the example shown in fig. 8 an incision 110 is first made in the transition area between the back meat 15 and the breast fillet 8 according to the first aspect not according to the invention. Then an incision 210 is made according to the invention. Making incision 110 first and then making incision 210 is the most practical sequence. It is however also conceivable for the sequence of these incisions to be reversed.

[0146] Fig. 8b shows a combined incision 215. This incision has a first part 215a in a part of the transition area between the breast fillet and the back meat 15. The second part of the incision 215b separates the abdominal muscle tissue 11 from the back meat 15. Combining these two incisions into a single incision 215 achieves the effect, on the one hand, that the abdominal muscle tissue 12 remains connected to the bone parts of the carcass part 1 and does not come along with the harvested meat and on the other hand that the back meat and the breast fillet can be harvested together as a single piece of meat as described in EP 1430780 A1.

[0147] The invention involves a method for processing a carcass part of slaughtered poultry, which carcass part comprises:

- bone parts with at least a part of the rib cage and a part of the spine,
- at least a part of the back meat that is naturally present on the rib cage and the spine,
- at least a part of the abdominal muscle tissue,

this method comprising the following steps:

- making a first incision through the back meat near the abdominal muscle tissue at least up to the underlying bone parts of the carcass part,
- detaching the back meat from the bone parts of the carcass part.

[0148] In a preferred embodiment of the method according to the invention, the carcass part also comprises at least a part of the breast fillet. In this embodiment, the method also comprises a step of making a second incision through the meat at least up to the bone parts lying under the meat, which second incision is made in an area between the breast fillet and the other muscle tissue that does not form part of the breast fillet, and which second incision in that area substantially follows the shape of the breast fillet.

[0149] In a preferred embodiment of the method according to invention, the carcass part also comprises at least a part of the breast fillet. In this embodiment, the method also comprises the step of making a second incision through the meat at least up to the bone parts lying under the meat, which second incision is made in an area between the breast fillet and the back meat, and which second incision in that area substantially follows the shape of the breast fillet.

[0150] In a preferred embodiment of the method according to the invention, the carcass part

also comprises at least a part of the breast fillet. In this embodiment, the method also comprises the step of making a second incision through the meat at least up to the bone parts lying under the meat, which second incision is made in an area between the breast fillet and the abdominal muscle tissue, and which second incision in that area substantially follows the shape of the breast fillet.

[0151] In a preferred embodiment of the method according to the invention, at least the first incision runs substantially perpendicular to the underlying bone parts of the carcass part.

[0152] In the method according to the invention, the first incision runs closely above the connection of the back meat to the underside of the rib cage.

[0153] In a preferred embodiment of the method according to the invention, the incision in the transition area between the back meat and the breast fillet substantially follows the contour of at least the part of the abdominal muscle tissue that connects the back meat with the bone parts on the back of the carcass.

[0154] In a preferred embodiment of the method according to the invention, the incision along the back meat and the incision in the transition area between the breast fillet and the abdominal muscle tissue are integrated into a single, continuous incision.

[0155] The invention also involves a device for processing a carcass part of slaughtered poultry, which carcass part comprises:

- bone parts with at least a part of the rib cage and a part of the spine,
- at least a part of the back meat that is naturally present on the rib cage and the spine,
- at least a part of the abdominal muscle tissue,

this device comprising:

- a cutting device with a blade for making a first incision through the back meat next to the abdominal muscle tissue at least up to the underlying bone parts of the carcass part.

[0156] In a preferred embodiment of the device according to the invention, the blade is a rotating blade or a static blade.

[0157] In a preferred embodiment of the device according to the invention, the blade is also adapted to make a second incision through the meat at least up to the bone parts lying under the meat, which second incision is made in an area between the breast fillet and the back meat, and which second incision in that area substantially follows the shape of the breast fillet.

[0158] In a preferred embodiment of the device according to the invention, the device further comprises a second blade, which second blade is adapted to make a second incision through

the meat at least up to the bone parts lying under the meat, which second incision is made in an area between the breast fillet and the back meat, and which second incision in that area substantially follows the shape of the breast fillet.

[0159] Fig. 17 shows an overview of a device according to the second aspect not according to the invention. This device comprises the guide 602, which in the exemplary embodiment shown comprises two parallel plates 602a,b. The plates 602a,b are substantially elongated, and extend in the conveying direction T1 of the carcass part 1. The plates 602a,b are positioned at some distance from each other, by which the space 604 is created between the two plates. It is also possible to have a connection 604* between the plates 602a,b so that the plates 602a,b and the connection 604* form a trough. Then there is only a space 604 between the plates 602a,b at the blades 601.

[0160] The guide 602 rests on support 620 and, together with this support 620, can move vertically as shown by arrow T3. Support 620 is connected to a lever 622 by a hinge 621. Lever 622 has a pivot point 623. A counterweight 624 is attached to the lever 622. The counterweight 624 is arranged on the side of the pivot point 623 opposite to hinge 621. As a result of this design the guide 602 can spring vertically. A spring can be used as an alternative to the lever design with counterweight. The advantage of the lever design with counterweight is however that it is more robust.

[0161] The guide 602 can be adjusted such that it is displaced in a vertical direction when a product carrier 50 with carcass part 1 passes by, but not if an empty product carrier passes. The vertical displacement of guide 602 can then be registered by a product detector 625 which can be designed as an optical sensor or a proximity switch for example. If an empty product carrier 50 passes by then the product detector is not actuated and scraper 605 does not become active. Also, the product carrier 50 can be turned away from the rotating blades 601 and the scraper 605. In this way damage to an empty product carrier 50 is prevented.

[0162] The device according to the exemplary embodiment of fig. 17 comprises two rotating blades 601. Each of the rotating blades 601 is disc-shaped and is rotatable around an associated shaft 603. The rotating blades 601 extend into the space 604 between the parallel plates 602a,b such that each can make an incision into a passing carcass part 1. In an alternative embodiment static blades can be used instead of rotating blades.

[0163] The scraper 605 is positioned directly adjacent to and behind the blades 601. In this example the shape of the rear edge of the plates 602a,b has been adapted to the shape of the scraper 605.

[0164] The scraper 605 comprises two scraper members 606a,b which in respect on their shape are mirror images of each other. The scraper members, like the plates 602a,b, are positioned at some distance from each other. The scraper members 606a,b are resilient around an axis that coincides with the rotation shaft 603 of the rotating blades 601. In order to achieve this each of the scraper members 606a,b is connected to the rotation shaft 603 by a

coupling plate 611. The coupling plate 611 is rotatable relative to the rotation shaft 603.

[0165] The scraper members 606a,b can move inwards and outwards transverse to the conveying direction T1. The advantage of this is that in this way they are even better able to follow the shape of the bone parts of the carcass part. In this way the scraper members 606a,b can be moved outwards, for example, to allow the relatively broad part of the carcass part near the wing joints to pass without damaging the wing joints.

[0166] In the example shown of fig. 17 the inwards and outwards movement of the scraper members 606a,b is achieved by the control mechanisms 610a,b, each of which is connected to one of the scraper members 606a,b. Each control mechanism 610 is actuated by a pneumatic cylinder 612a,b.

[0167] It is preferable that control of the cylinders 612a,b and therewith of the control mechanisms 610a,b is linked to the signal from the product detector 625. In this way it is possible to assign the scraper members 606a,b an active and an inactive position. In the active position the scraper members 606a,b process a passing carcass part 1, but if the scraper members 606a,b are in their inactive position they will not process any passing carcass part. In practice the scraper members 606a,b in their inactive position will stand further to the outside than in their active position. With a coupling of the control of the control mechanisms 610a,b to the product detector 625, the scraper members can be for example sent to their active position only when a carcass part 1 actually arrives. Additionally, or as an alternative, the scraper members 606a,b can be sent to their inactive position if an empty product carrier 50 is approaching.

[0168] The control mechanism 610a,b in the examples shown uses one or more levers. It will be evident to the skilled person that other embodiments of the control mechanism are also possible.

[0169] Fig. 18 shows the device shown in fig. 17 during performance of a first phase of the method according to the second aspect not according to the invention. The control mechanisms 610a,b are only shown in part.

[0170] A product carrier 50 carries a carcass part 1 and conveys this carcass part in conveying direction T1 relative to the device. In the example shown the incision 110 has been made in the carcass part according to the first aspect not according to the invention. This is advantageous, but not a necessary for using the second aspect not according to the invention. If necessary the incision 210 according to the invention can already have been made also.

[0171] In the stage of fig. 18 the carcass part 1 is being guided and positioned relative to the device through the guide 602, particularly relative to the rotating blades 601 and the scraper members 606a,b. To this end the plates 602a,b in this example are positioned at an angle to the horizontal plane (see fig. 19). This in fact creates a trough, which effectively positions the carcass part.

[0172] The product carrier 50 conveys the carcass part 1 further in conveying direction T1 relative to the device according to the second aspect not according to the invention. When the carcass part has been positioned by the guide 602, the rotating blades 601 come into contact with carcass part 1. The rotating blades 601 each make an incision in the carcass part 1, on either side of the spine. It is preferable that this incision cuts up to the bone parts of the carcass part.

[0173] Figs. 31A and B show the situation of fig. 18 in cross section. Here, fig. 19B is a partial enlargement of fig. 19A. In fig. 19 it can be seen that the blades 601 make an incision in the carcass part on either side of the spine.

[0174] Fig. 32 20 shows the device of fig. 17 during performance of a second phase of the method according to the second aspect not according to the invention. The control mechanisms 610a,b are only shown in part.

[0175] The incisions along the spine have been made, and scraping has started. The scraper members 606a,b have such a shape, and are aligned relative to the blades 601 in such a manner that the scraper members 606a,b protrude into the incisions that have been made by the blades 601. So they start their scraping action from these incisions.

[0176] The scraper members 606a,b are each provided with a sharp leading edge 607. This cutting edge detaches the back meat in the first instance by cutting through the connective membrane between the back meat 15 and the bone parts of the carcass part.

[0177] In fig. 20 it can be clearly seen that each of the scraper members 606a,b includes a recess 608. These recesses 608 ensure that the wing joints of the carcass part 1 to be processed, which protrude a little in relation to the other bone parts of the carcass part 1, are able to pass the scraper members undamaged. This is shown in cross section in fig. 22.

[0178] Further, the raised lip 609 can be clearly seen in fig. 20. This lip is particularly suited for scraping loose the connection between the back meat and the scapula. Fig. 21 shows the device of fig. 17 during performance of a third phase of the method according to the second aspect not according to the invention. The control mechanisms 610a,b are only shown in part.

[0179] The carcass part 1 is advanced further relative to the device. The scraper members 606a,b thereby progressively scrape more back meat loose. In the embodiment shown, however, the meat in the area that is indicated by "A" in fig. 21 remains connected to the bone parts of the carcass part. In practice area A will be larger and will extend further in the direction of the sternum if the incision 210 has not been made prior to the performing of the method according to the second aspect not according to the invention.

[0180] By not detaching the back meat entirely from the bone parts of the carcass part 1, processing according to the second aspect not according to the invention is a good preparation

for processing according to the third aspect not according to the invention.

[0181] If the incisions 110 and 210 have been made in the carcass part 1, the part of the back meat 15 that is to be detached by the scraper members 606a,b is clearly defined. The area of the carcass part 1 within which the back meat 15 is to be detached is limited by the incisions 110 and 210. In order to prevent the scraper members 606a,b trying to detach meat from the bone parts of the carcass part beyond the incision 210 the scraper members 606a,b are moved away from the carcass part 1 as soon as they reach the incision 210. In the example of figs. 17-21 this is achieved using the control mechanism 610. They can also be moved to the outside earlier so that meat remains attached over a greater area, such as the area that is indicated by "B" for example. This is particularly advantageous if the method according to the second aspect not according to the invention is used in preparation for the method according to the third aspect not according to the invention.

[0182] It is also, for that matter, possible to apply the method and the device according to the second aspect not according to the invention if the incisions 110 and/or 210 have not been made. In practice, for those cases where the method according to the second aspect not according to the invention is used in preparation for the method according to the third aspect not according to the invention, it has proved favourable to make incision 110 prior to the method according to the second aspect not according to the invention and incision 210 thereafter.

[0183] The method and device according to the second aspect not according to the invention could also be applied such that the back meat 15 is separated from the bone parts of the carcass part 1 in its entirety.

[0184] Fig. 22 shows the situation shown of fig. 21 in cross section. The control mechanisms 610a,b are shown only in part. In fig. 22 it can be clearly seen that the recesses 608 on the scraper members 606a,b make it possible for the wing joints 31 to pass the scraper members 606a,b without being damaged. It can also be seen from fig. 22 that the back meat remains partly connected to the bone parts of the carcass part 1.

[0185] Figs. 23 and 24 show a scraper member according to a preferred embodiment of the second aspect not according to the invention. In these figures the rising cutting edge 607 with its curved shape, the recess 608 and the raised lip 609 can be clearly seen. The curved shape of the hollow 615 is adjusted to the shape of the blade 601, as indicated in fig. 24.

[0186] It will be evident to the skilled person that where there is mention above of a movement of the carcass part to be processed relative to the processing components of the device that are engaging the carcass part while processing is being carried out, this relative movement can be achieved by having the carcass part move relative to the processing components of the device, by having the processing components of the device move relative to the carcass part, or by a combination of both.

[0187] The second aspect not according to the invention involves a method for processing a carcass part of slaughtered poultry, which carcass part comprises:

- bone parts with at least a part of the back of the rib cage and the spine,
- at least a part of the back meat that is naturally present on the back of the rib cage and the spine,

this method comprising the following steps:

- making two incisions on the back side of the carcass part, which incisions extend on either side of the spine and which incisions separate the back meat from the spine on either side of the spine,
- detaching at least a part of the back meat that is naturally present on the carcass part using a scraper, which scraper has a cutting edge with a curved shape in a plane that substantially extends perpendicular to the direction of the spine, which curved shape substantially matches the side of the back of the contour of the bone parts of the carcass part from which the back meat must be detached, as seen in the direction of the spine, which cutting edge is sharp so that the connection between the back meat and the bone parts of the carcass part is cut through, in which detachment of the back meat by the scraper starts from the incisions along the spine, and in which the carcass part and the scraper move relative to each other while the meat is being detached.

[0188] In a preferred embodiment of the method according to the second aspect not according to the invention, the back of the carcass part is directed downwardly during processing.

[0189] In a preferred embodiment of the method according to the second aspect not according to the invention, the carcass part is supported by the scraper while the scraper is detaching the back meat.

[0190] The second aspect not according to the invention also involves a device for processing a carcass part of slaughtered poultry, which carcass part comprises:

- at least a part of the back,
- at least a part of the meat that is naturally present on the back,

this device comprising:

- a guide for guiding and positioning the carcass part to be processed in relation to the device,
- at least one blade for making two incisions on the back side of the carcass part, which incisions extend on each side of the spine and which incisions separate the back meat from the spine on either side of the spine,
- a scraper for detaching at least a part of the back meat that is present on the carcass

part, which scraper has a cutting edge with a curved shape in a plane that extends substantially perpendicular to the direction in which the spine extends, which curved shape matches substantially the side of the back of the contour of the bone parts of the carcass part from which the back meat must be detached, as seen in the direction of the spine, which cutting edge is sharp and directly adjacent to the blade in such a way that the detaching of the back meat by the scraper starts from the incision along the spine.

[0191] In a preferred embodiment of the device according to the second aspect not according to the invention, the guide comprises two parallel plates that are positioned at some distance from each other. Preferably, the parallel plates are elongated and extend substantially in the direction which is during operation the direction of the relative movement between the carcass part and the scraper.

[0192] In a preferred embodiment of the device according to the second aspect not according to the invention, the blade comprises two rotating blades mounted parallel to each other.

[0193] In a preferred embodiment of the device according to the second aspect not according to the invention, the cutting edge of the scraper rises in the upstream direction of the relative movement of the carcass part in relation to the scraper. Preferably, the cutting edge has a curved shape, as seen in the direction transverse to the direction of the relative movement of the carcass part in relation to the scraper.

[0194] In a preferred embodiment of the device according to the second aspect not according to the invention, the scraper is resiliently mounted.

[0195] In a preferred embodiment of the device according to the second aspect not according to the invention, the blade comprises two rotating blades mounted parallel to each other, the scraper is resiliently mounted and the scraper is resilient such that the resilient movement takes place around a rotation axis that coincides with the rotation axis of the rotating blades.

[0196] In a preferred embodiment of the device according to the second aspect not according to the invention, the scraper comprises two scraper members, each of which is adapted to detach at least a part of the back meat from the bone parts of the carcass part on one side of the spine, which scraper members are formed as mirror images of each other. Preferably, the scraper members are positioned at some distance from each other.

[0197] The second aspect not according to the invention also involves a scraper member, suitable for use in this preferred embodiment of a device according to the second aspect not according to the invention, which scraper member is adapted to detach at least a part of the back meat from the bone parts on one side of the spine on the carcass part, which scraper member has a cutting edge with a curved shape in a plane that extends substantially perpendicular to the direction of the spine, which curved shape matches substantially the side

of the back of the contour of the bone parts of the carcass part from which the back meat must be detached, as seen in the direction of the spine, which cutting edge is sharp.

[0198] In a preferred embodiment of the device according to the second aspect not according to the invention, the scraper has at least one raised lip to scrape loose the connection between the back meat and the scapula.

[0199] In a preferred embodiment of the device according to the second aspect not according to the invention, the scraper has a recess to allow passage of the wing joint.

[0200] The second aspect not according to the invention also involves a scraper, suitable for use in a device according to the second aspect not according to the invention, the scraper having a cutting edge with a curved shape in a plane that extends substantially perpendicular to the direction in which the spine extends, which curved shape matches substantially the side of the back of the contour of the bone parts of the carcass part from which the back meat must be detached, as seen in the direction of the spine, which cutting edge is sharp.

[0201] The second aspect not according to the invention also involves a scraper member as shown in fig. 23 and/or 24.

[0202] Figs. 9 up to and including 14 relate to the third aspect not according to the invention, harvesting the back meat 15.

[0203] Figs. 9 and 10 show a part of a first embodiment of the method and device according to the third aspect not according to the invention. Here a carrier 50 holds the carcass part 1. The product carrier 50 engages on the inside of the carcass part. The carcass part comprises at least a part of the back and at least a part of the meat that is naturally present on the back. In this example the carcass part also comprises at least a part of the breast fillet and at least a part of the wings 4.

[0204] Figs. 9, 10 and 11 show various stages of the method according to the third aspect not according to the invention.

[0205] The incisions 110 according to the first aspect not according to the invention and the incision 210 according to the invention have been made in the carcass part. Instead of the incisions 110 and 210 a combined incision 215 as shown in fig. 8b may also have been made for example. For the invention it is not a requirement that one or more of the incisions 110, 210, 215 are made. It is however advantageous if this is the case.

[0206] As the first step in the method according to the third aspect not according to the invention the back meat 15 is partly detached from the bone parts of the carcass part 1. This can be achieved, for example, by the device and/or the method according to the second aspect not according to the invention.

[0207] When the product carrier 50 has advanced the carcass part 1 up to the part of the device that is shown in fig. 9, the product carrier 50 holds the carcass part in such a position that the detached parts of the back meat 15 hang free of the bone parts of the carcass part 1 (see fig. 9). In the example the carcass part 1 enters the device with the back directed downwardly, so that the detached parts of the back meat 15 hang down.

[0208] In the example shown in figs. 9, 10 and 11 the back meat 15 is still connected to the bone parts of the carcass part 1 near the incision 210, while on the neck side of the carcass part 1 (that is: the side of the carcass part where the neck was attached) it has already been detached from the bone parts of the carcass part.

[0209] The product carrier 50 conveys the carcass part further in the main direction T1. As soon as the free-hanging parts of the previously detached part of the back meat 15 are within range of the rollers 321, 322, 323 and 324 a profile 325 that has been applied to the rollers 321-324 engages the free-hanging part of the back meat 15. It is preferable that the product carrier moves the carcass part 1 upwards and downwards somewhat. This ensures that the loose-hanging back meat is engaged by the rollers in a reliable manner.

[0210] The rollers 321 - 324 are positioned relatively to each other in such a manner that there is space between the profiles 325 of the various rollers. This space prevents the back meat 15 being crushed between the profiles of adjacent rollers. Because of the distance between the rollers the structure of the back meat 15 removed remains intact.

[0211] As soon as the profile has engaged the free-hanging parts of the back meat 15, the rollers peel the back meat 15 off the bone parts of the carcass part (see fig. 10). The rollers exert a peeling force on the back meat, so that the back meat is detached from the bone parts of the carcass part in a gradual manner. This peeling force is created on account of the loose-hanging part of the back meat 15 being forced in a direction opposite to the conveying direction.

[0212] Here, it is advantageous if the product carrier 50 continues to convey the carcass part 1 in the conveying direction T1. In this process it is even more advantageous if the profile 325 of the rollers 321-324 has such a hand that it forces the detached part of the back meat 15 in a direction T2 which is opposite to T1. It is, of course, obvious that the rollers have to rotate around their longitudinal axis to ensure correct operation of the device. This is shown in fig. 10.

[0213] Fig. 11 shows the stage in which the back meat 15 has been removed by the rollers 321-324.

[0214] Four rollers are applied in the exemplary embodiment of figs. 9, 10 and 11. It is, however, also possible to carry out the invention using two rollers. It is preferable that the rollers, be it four or two, are resiliently mounted. Consequently the rollers can press against the carcass part with pre-tensioning and they can follow the natural variation in the dimensions of the various carcass parts 1 to be successively processed.

[0215] In the exemplary embodiment shown in figs. 9, 10 and 11 the rollers are provided with a helical profile in the form of a rib. It is however also possible for the rollers to be provided with multiple projections that engage the previously detached part of the back meat 15. These projections can possibly be arranged along a helical line.

[0216] It is advantageous if the mutual positions of the rollers, as seen in the longitudinal direction of the rollers, substantially follow the contour of the part of the carcass part 1 that is guided over the rollers.

[0217] When peeling the back meat 15 off the carcass part the rollers exert a force on the back meat 15 that they are engaging on. In order to optimize the direction of the force it is advantageous if the carcass part 1 and the rollers 321-324 can pivot in relation to each other. In the design this is easiest to achieve by pivoting the product carrier 50 around pivot axis 51.

[0218] Fig. 12 diagrammatically depicts the back meat 15 being peeled off the back 2 of the carcass part 1. The profile 325 of the rollers 321-324 grips the free-hanging part of the back meat 15. During this process the rollers 321-324 rotate as indicated in fig. 11. Consequently they pull the back meat 15 loose from the bone parts of the carcass part 1. Because of the arrangement of the rollers, the rollers exert a force in such a direction that the back meat 15 is peeled off the bone parts of the carcass part.

[0219] There is a space 326 between the rollers 321 and 323. A similar space 326 exists between rollers 322 and 324. Because of the presence of these spaces 326 the back meat 15 is not crushed between the rollers, but retains its structure of quality meat to a high degree.

[0220] Figs. 13 and 14 show successive stages of a variation of the method according to the third aspect not according to the invention. In fig. 13 the carcass part 1 is approaching the rollers 321-324. A part of the back meat 15 has already been detached and is hanging free so that it can easily be engaged by the rollers 321-324. Fig. 14 shows that the rollers 321-324 peel the back meat 15 off the bone parts of the carcass part 1. The hand of the helical profile 325 on the rollers is selected such that the profile forces the back meat that is peeled off in a direction T2, which direction T2 is opposite to that of the main conveying direction T1 in which the product carriers 50 convey the carcass parts 1. Fig. 14 shows that the back meat 15 has been detached from the bone parts of the carcass part 1.

[0221] In the embodiment of the figs. 9, 10 and 11 the product carrier 50 holds the carcass part 1 to be processed by engaging on the inside of the carcass part 1. If the carcass part 1 still comprises leg parts 5, however, a product carrier 50 that engages on the leg parts 5 can also be used. This is shown in figs. 13 and 14. In this embodiment the product carrier itself cannot pivot the carcass part in such a way that the spine or the part of it that is still present in the carcass part comes to lie mainly horizontally. In the embodiment of the figs. 13 and 14 the carcass part is therefore supported on the back by the rollers 321-324. Guides 330 hold the carcass part in the correct position sideways. It is envisaged that in a variation, not shown, of

the embodiment shown in figs. 13 and 14 for an additional guide is present that presses the back of the carcass part 1 firmly against the rollers 321-324.

[0222] Figs. 15 and 16 show a variation of a part of the device and the method according to the third aspect not according to the invention. In this variation the axial direction of the rollers 321-324 makes a preferably acute, angle α with the main conveying direction T1 in which the product carriers 50 convey the carcass parts.

[0223] In the variation shown in figs. 15 and 16, further the rollers 321-324 are positioned in such a way in relation to each other that the carcass part 1 to be processed is moved at least partly in between of the rollers 321-324.

[0224] Because of this arrangement of the rollers the back meat is peeled off the bone parts of the carcass part more or less in a sideways direction.

[0225] In this variation it is preferable that the product carrier 50 is pivotable relative to rollers 321-324, around pivot axis 51 for example. In this way the direction of the force exerted on the back meat 15 by the rollers 321-324 can be optimized.

[0226] The embodiment of the figs. 15 and 16 has proven very effective in practice.

[0227] The variation shown in figs. 15 and 16 is also particularly suitable for processing front halves without wings.

[0228] In general it is advantageous if the device according to the third aspect not according to the invention is fitted with a product detector. The product detector detects whether a carcass part 1 is present on the product carrier 50 or whether the product carrier 50 is empty. Detection can occur in various ways, optically or mechanically for example. In the latter case a guide is pressed in by a passing carcass part 1 for example but not by a passing empty product carrier 50. The product detector then detects whether the guide has been pressed in or not. If a carcass part 1 is detected the device according to the third aspect not according to the invention becomes active and the back meat is removed. This can for example be achieved by having the product carrier 50 bring the carcass part 1 within range of the rollers. However, if no carcass part 1 is detected then the rollers and the product carrier 50 are kept away from each other. The advantage of this is that the rollers cannot damage a passing empty product carrier 50.

[0229] It will be evident to the skilled person that where in the above a movement of the carcass part to be processed is involved relative to the processing components of the device that are engaging the carcass part while processing is being carried out, this relative movement can be achieved by having the carcass part move relative to the processing components of the device, by having the processing components move relative to the carcass part, or by a combination of both.

[0230] The third aspect not according to the invention involves a method for processing a carcass part of slaughtered poultry, which carcass part comprises:

- bone parts with at least a part of the back of the rib cage and the spine,
- at least a part of the meat that is naturally present on the back of the rib cage and the spine,

this method comprising the following steps:

- detaching a part of the back meat from the underlying bone parts of the carcass part,
- engaging at least a part of the detached back meat, and then peeling the back meat off the bone parts of the carcass part.

[0231] In a preferred embodiment of the method according to the third aspect not according to the invention, the back meat is engaged by at least two rotating rollers, each of which is provided with a profile, which rollers, also peel the back meat off the bone parts of the carcass.

[0232] In a preferred embodiment of the method according to the third aspect not according to the invention, the carcass part is advanced in a conveying direction in relation to the rollers during engaging and/or peeling-off. Preferably, the rotating rollers move the back meat in a direction that is opposite to the conveying direction. Preferably, the carcass part is moved at least partly between the rollers.

[0233] In a preferred embodiment of the method according to the third aspect not according to the invention, during engaging of the back meat, the carcass part is oriented such that the previously detached part of the back meat hangs free from the bone parts of the carcass part. Preferably, in this preferred embodiment or in the previously mentioned preferred embodiment, the carcass part is pivoted around an axis that lies substantially perpendicular to the carcass part's plane of symmetry while the back meat is peeled off.

[0234] In a preferred embodiment of the method according to the third aspect not according to the invention, the carcass part is arranged onto a product carrier and the product carrier engages on the inside of the carcass part.

[0235] The third aspect not according to the invention also involves a device for processing a carcass part of slaughtered poultry, which carcass part comprises:

- bone parts with at least a part of the back of the rib cage and the spine,
- at least a part of the back meat that is naturally present on the back of the rib cage and the spine, which back meat has been partly detached from the bone parts of the carcass part,

this device comprising:

- a gripper for engaging on at least a part of the previously detached back meat, and
- a peeler for peeling the back meat off the bone parts of the carcass.

[0236] In a preferred embodiment of the device according to the third aspect not according to the invention, the device comprises at least two rotatable rollers, each of which rollers is provided with a profile on the outer periphery, in which the rollers form part of both the gripper and the peeler.

[0237] Preferably, the profile on the rollers is helical. Preferably, the rollers are mounted substantially parallel. Preferably, during operation, the carcass parts are moved in a conveying direction relative to the rollers, and the axial direction of the rollers and the conveying direction of the carcass part form a relative angle at the location of the rollers. Preferably, the rollers are positioned at some from each other and more preferably the distance between the rollers has such dimensions that it allows the carcass part to move at least partly in between of the rollers. Preferably, the rollers are resiliently mounted.

[0238] Preferably, use is made of four substantially parallel rollers, each of the rollers being provided with a profile for engaging the back meat and peeling the back meat off the bone parts of the carcass, preferably the profile is helical. Preferably, the rollers are arranged relative to each other in such a manner that, as seen in the axial direction of the rollers, they approximate the contour of the carcass part as seen in the direction of the spine.

[0239] List of Latin names for the muscles shown in figs. 1A, 1B and 5:

A1 - M. pectoralis superficialis A2 - M. obliquus externus abdominis; A3 - M. obliquus internus abdominis; A4 - M. cutaneus pectoralis cranialis; A5 - M. cutaneus pectoralis caudalis; A6 - M. patagialis; A7 - M. tensor patagii longus; A8 - cutaneus costohumeralis; A9 - M. cutaneus iliacus; A10 - M. biceps brachii; A11 - M. triceps brachii, caput mediale; A12 - M. expansor secundarium; A13 - M. triceps brachii, caput dorsale; A14 - M. latissimus dorsi, pars cranialis; A15 - M. teres major et infraspinatus; A16 - M. latissimus dorsi, pars caudalis; A17 - M. rhomboideus; A18 - M. serratus magnus; A19 - M. levator caudae; A20 - M. levator rectricum; A21 - M. depressor caudae; A22 - M. basirectricales; A23 - M. depressor rectricum; A24 - M. caudalis lateralis; A25 - M. levator ani; A26 - M. transversus perinei; A27 - M. sphincter ani; A28 - Bursa Fabricii.

[0240] B1 - M. biceps brachii; B2 - M. triceps brachii; B3 - M. expansor secundarium; B4 - M. latissimus dorsi; B5 - M. teres major et infraspinatus; B6 - M. serratus magnus; B7 - M. serratus ventralis; B8. Mm. levatores costarum; B9 - M. sternocostalis; B10 - obliquus externus abdominis; B11 - M. Aponeurois m. obliqui externi abdominis; B12 - Mm. intercostales externi; B13 - Mm. subcostales; B14 - M. pectoralis superficialis; B15 - M. pectoralis profundus; B16 - M. coracobrachialis externus; B17 - M. coracobrachialis internus; B18 - M. coracobrachialis dorsalus; B19 - M. subscapularis.

REFERENCES CITED IN THE DESCRIPTION

Cited references

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Patentkrav

1. Fremgangsmåde til forarbejdning af en slagtekropsdel (1) af slagtet fjerkræ, hvor slagtekropsdelen (1) omfatter:

- 5 - knogledele med mindst en del af brystkassen og en del af rygsøjlen,
- mindst en del af rygkødet (15), der er naturligt til stede på brystkassen og rygsøjlen,
- mindst en del af mavemuskelvævet (11),
10 hvilken fremgangsmåde omfatter følgende trin:
- udførelse af et første indsnit (210) gennem rygkødet (15) tæt på mavemuskelvævet (11) mindst op til de underliggende knogledele af slagtekropsdelen (1) mellem hæftningen af rygkødet (15) til brystkassen og placeringen af halsen på
15 slagtekropsdelen til derved afskæring af rygkødet, så det kan udtages fra forbindelsen af rygkødet (15) til brystkassen, således at når rygkødet fjernes fra knogledelene af slagtekropsdelen, så forbliver mavemuskelvævet bagved på knogledelene,
20 - frigørelse af rygkødet (15) fra knogledelene på slagtekropsdelen (1).

2. Fremgangsmåde ifølge krav 1,
hvor slagtekropsdelen endvidere omfatter mindst en del af
25 brystfileten, hvilken fremgangsmåde endvidere omfatter et trin med udførelse af et andet indsnit gennem kødet mindst op til knogledelene, der ligger under kødet, hvilket andet indsnit laves i et område mellem brystfileten og det andet muskelvæv, der ikke udgør en del af brystfileten, og hvilket andet indsnit
30 i dette område i det væsentlige følger formen af brystfileten.

3. Fremgangsmåde ifølge krav 1,
hvor slagtekropsdelen endvidere omfatter mindst en del af brystfileten, hvilken fremgangsmåde endvidere omfatter trin
35 med udførelse af et andet indsnit gennem kødet mindst op til knogledelene, der ligger under kødet, hvilket andet indsnit laves i et område mellem brystfileten og rygkødet, og hvilket andet indsnit i dette område i det væsentlige følger formen af

brystfileten.

4. Fremgangsmåde ifølge krav 1,
hvor slagtekropsdelen endvidere omfatter mindst en del af
5 brystfileten, hvilken fremgangsmåde endvidere omfatter trin
med udførelse af et andet indsnit gennem kødet mindst op til
knogledelene, der ligger under kødet, hvilket andet indsnit
laves i et område mellem brystfileten og mavemuskelvævet, og
hvilket andet indsnit i dette område i det væsentlige følger
10 formen af brystfileten.

5. Fremgangsmåde ifølge et hvilket som helst af ovennævnte
krav,
hvor mindst det første indsnit løber i det væsentlige vinkelret
15 på de underliggende knogledele af slagtekropsdelen.

6. Fremgangsmåde ifølge et hvilket som helst af ovennævnte
krav,
hvor det første indsnit løber tæt over hæftningen af rygekødet
20 til undersiden af brystkassen.

7. Fremgangsmåde ifølge krav 4,
hvor indsnittet i overgangsområdet mellem rygekødet og
brystfileten i det væsentlige følger konturen af mindst den del
25 af mavemuskelvævet, der forbinder rygekødet med knogledelene på
ryggen af slagtekroppen.

8. Fremgangsmåde ifølge krav 4,
hvor indsnittet langs rygekødet og indsnittet i overgangsområdet
30 mellem brystfileten og mavemuskelvævet er integreret i et enkelt
fortløbende indsnit.

9. Anordning til forarbejdning af en slagtekropsdel af slagtet
fjerkræ, hvilken slagtekropsdel omfatter:
35 - knogledele med mindst en del af brystkassen og en del af
rygsøjlen,
- mindst en del af rygekødet, der er naturligt til stede på
brystkassen og rygsøjlen,

- mindst en del af mavemuskelvævet,
hvilken anordning omfatter:

5 - en skæreanordning med et blad til udførelse af et første
indsnit gennem rygekødet ved siden af mavemuskelvævet mindst op
til de underliggende knogledele af slagtekropsdelen mellem
hæftningen af rygekødet (15) til brystkassen og placeringen af
halsen på slagtekropsdelen til derved afskæring af rygekødet, så
det kan udtages fra forbindelsen af rygekødet (15) til
brystkassen, således at når rygekødet fjernes fra knogledelene
10 af slagtekropsdelen, så forbliver mavemuskelvævet bagved på
knogledelene.

10. Anordning ifølge krav 9,
hvor bladet er et roterende blad eller et statisk blad.

15

11. Anordning ifølge krav 9 eller 10,
hvor bladet endvidere er indrettet til at lave et andet indsnit
gennem kødet mindst op til knogledelene, der ligger under kødet,
hvilket andet indsnit laves i et område mellem brystfileten og
20 rygekødet, og hvilket andet indsnit i dette område i det
væsentlige følger formen af brystfileten.

12. Anordning ifølge krav 9 eller 10,
hvor anordningen yderligere omfatter et andet blad, hvilket
25 andet blad er indrettet til at lave et andet indsnit gennem
kødet mindst op til knogledelene, der ligger under kødet,
hvilket andet indsnit laves i et område mellem brystfileten og
rygekødet, og hvilket andet indsnit i dette område i det
væsentlige følger formen af brystfileten.

DRAWINGS

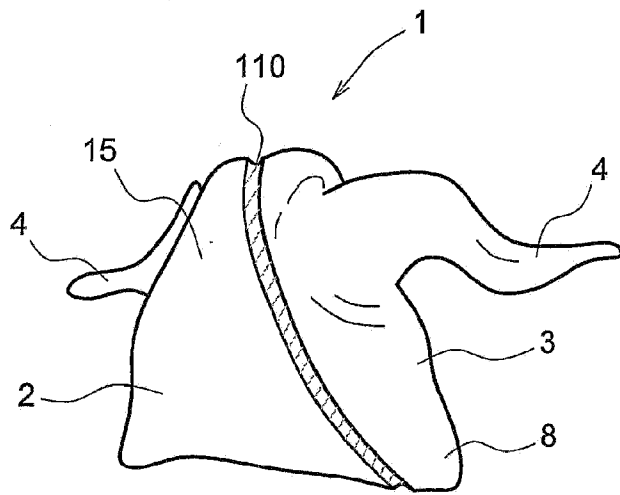


Fig. 1

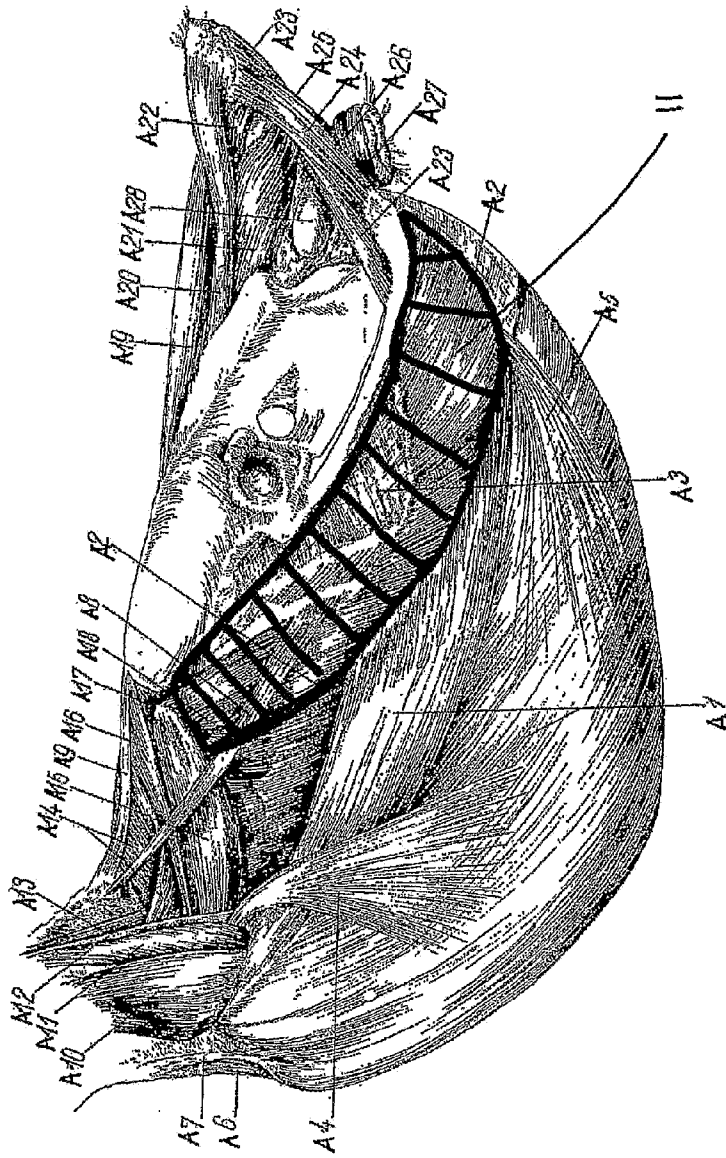


Fig.1A

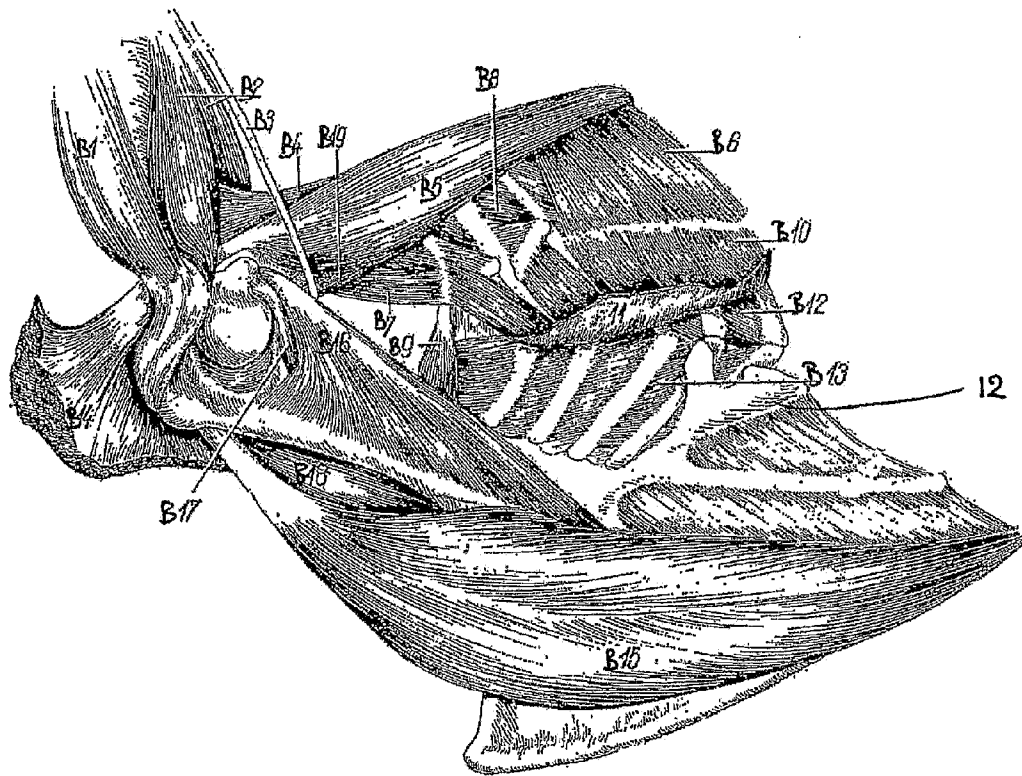


Fig.1B

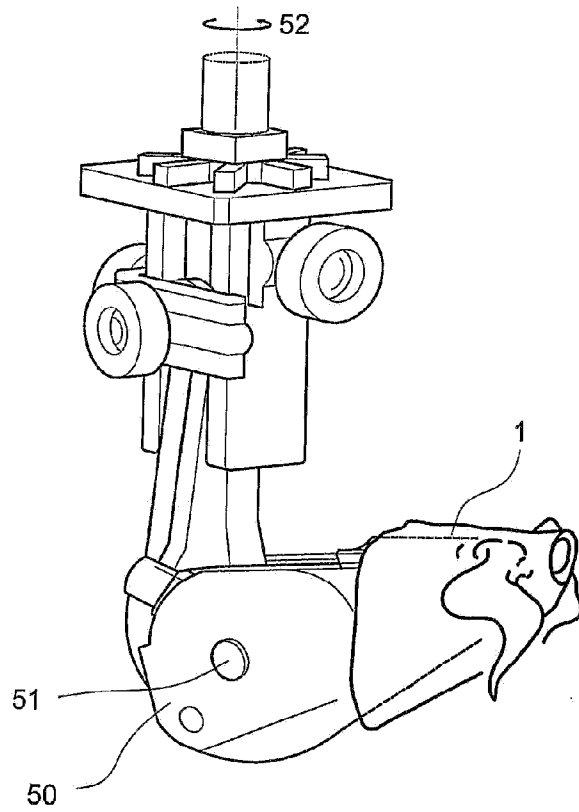


Fig. 1C

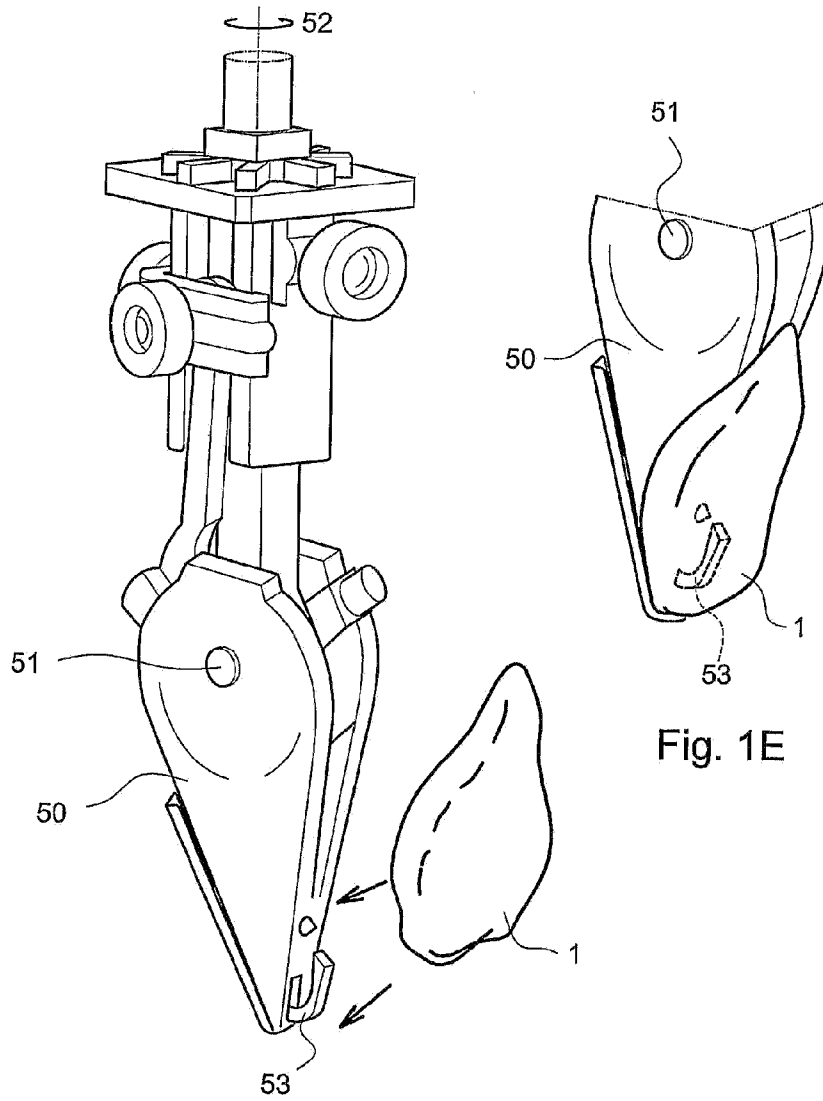


Fig. 1D

Fig. 1E

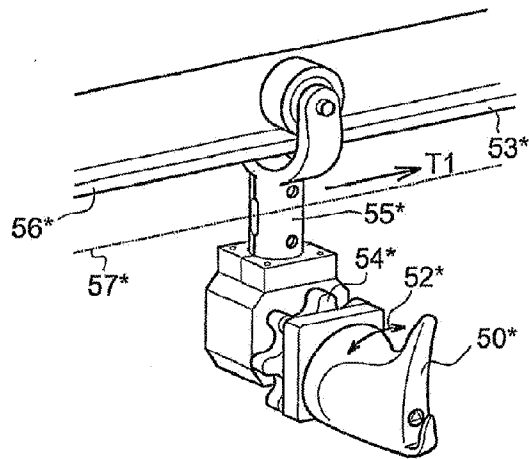


Fig. 1F

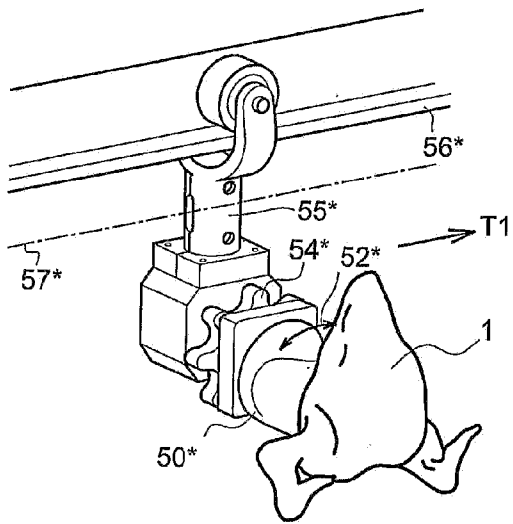


Fig. 1G

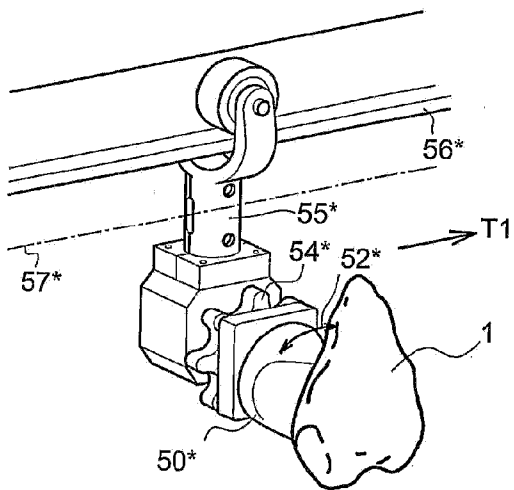


Fig. 1H

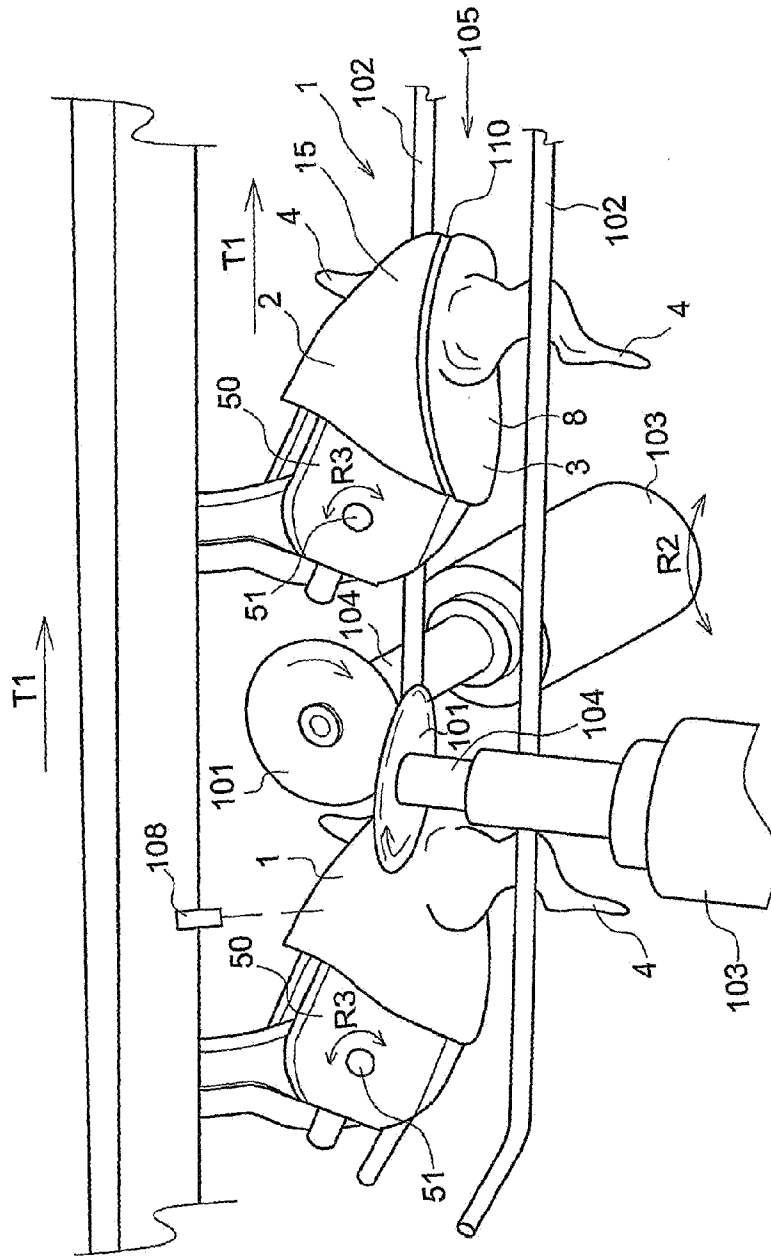
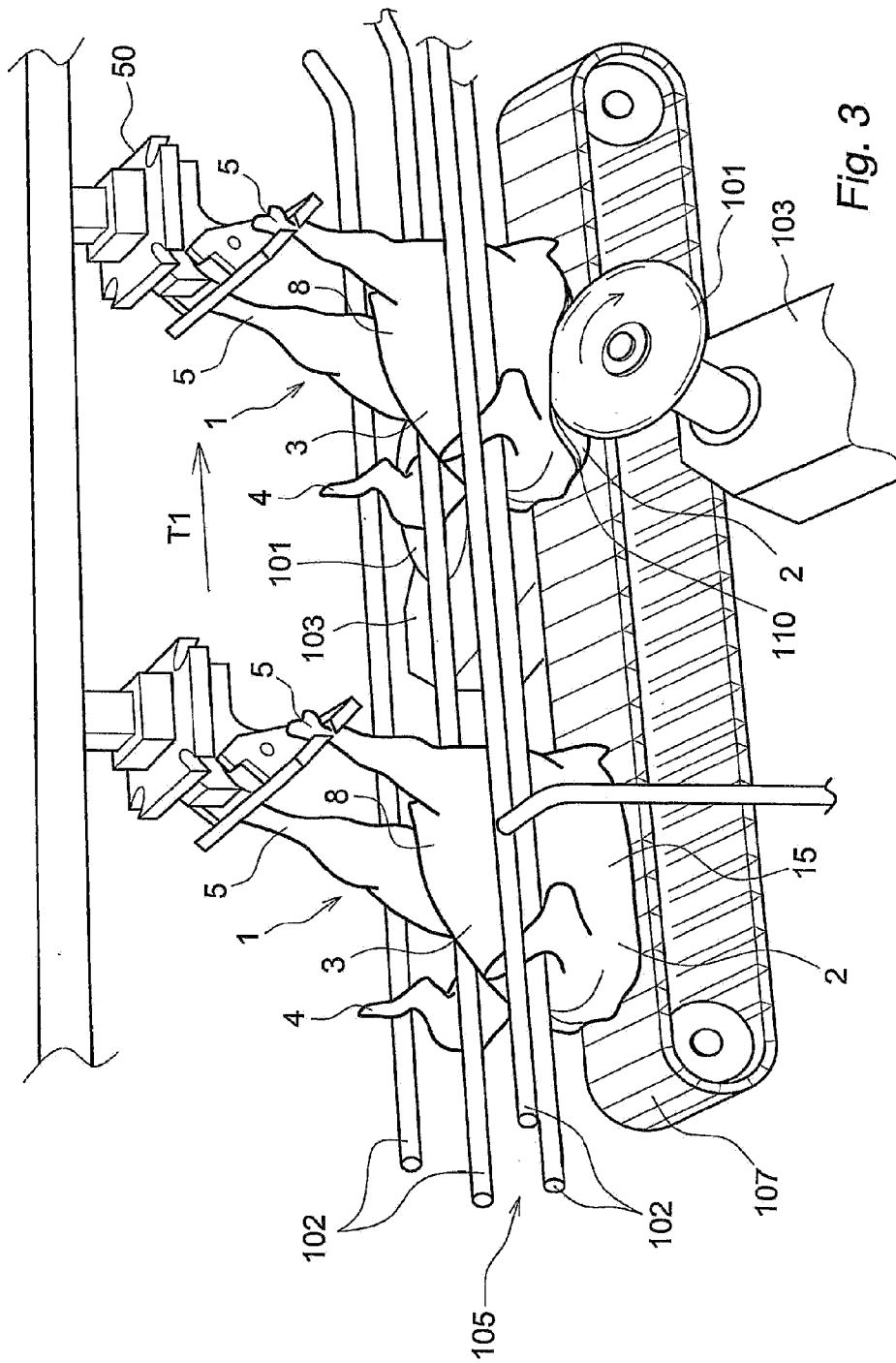


Fig. 2



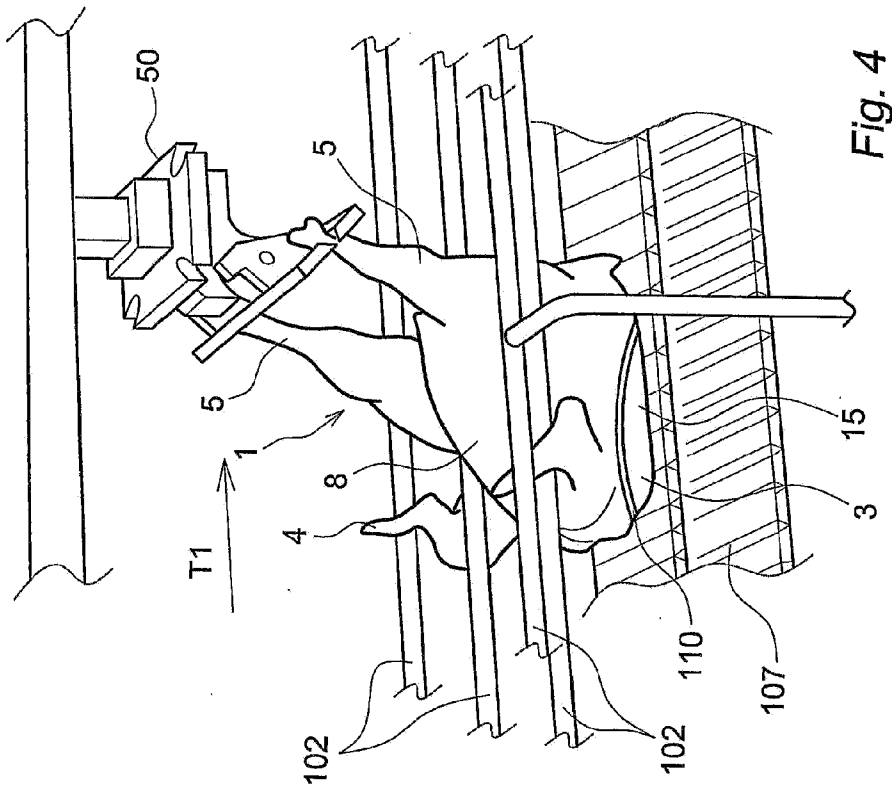


Fig. 4

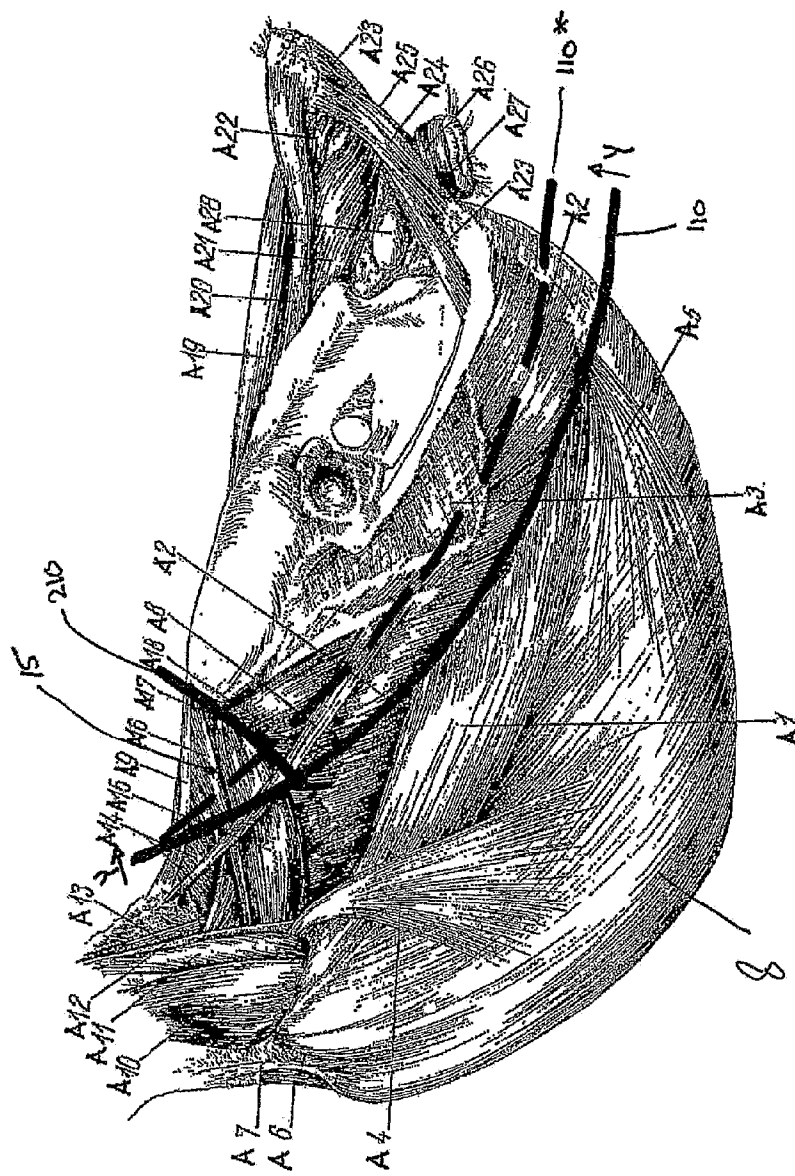
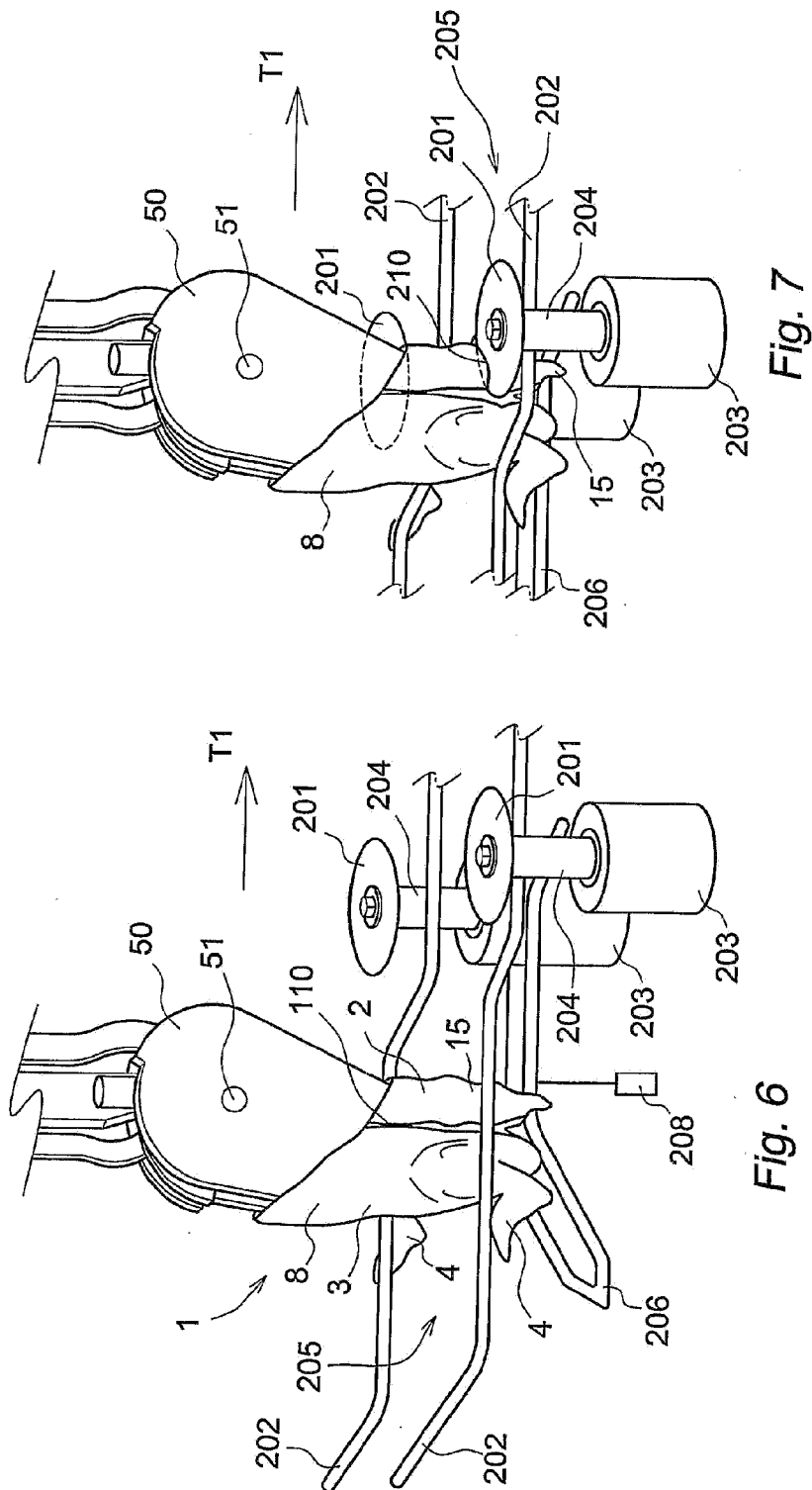


Fig. 5



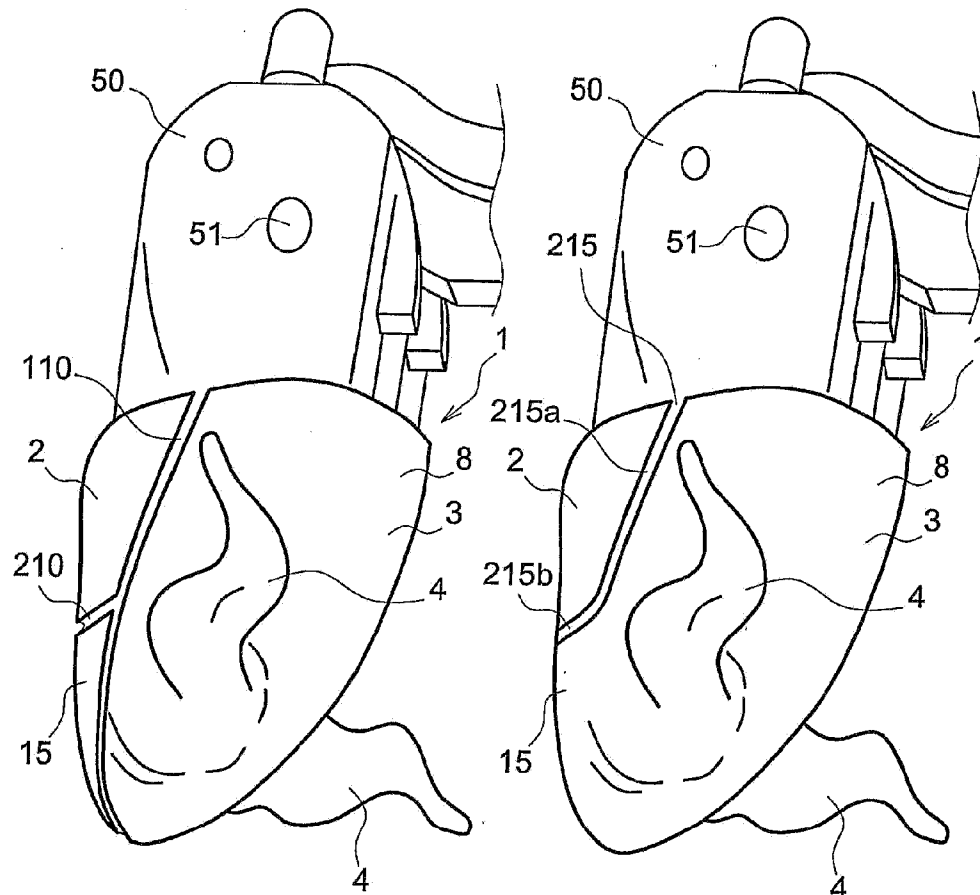


Fig. 8a

Fig. 8b

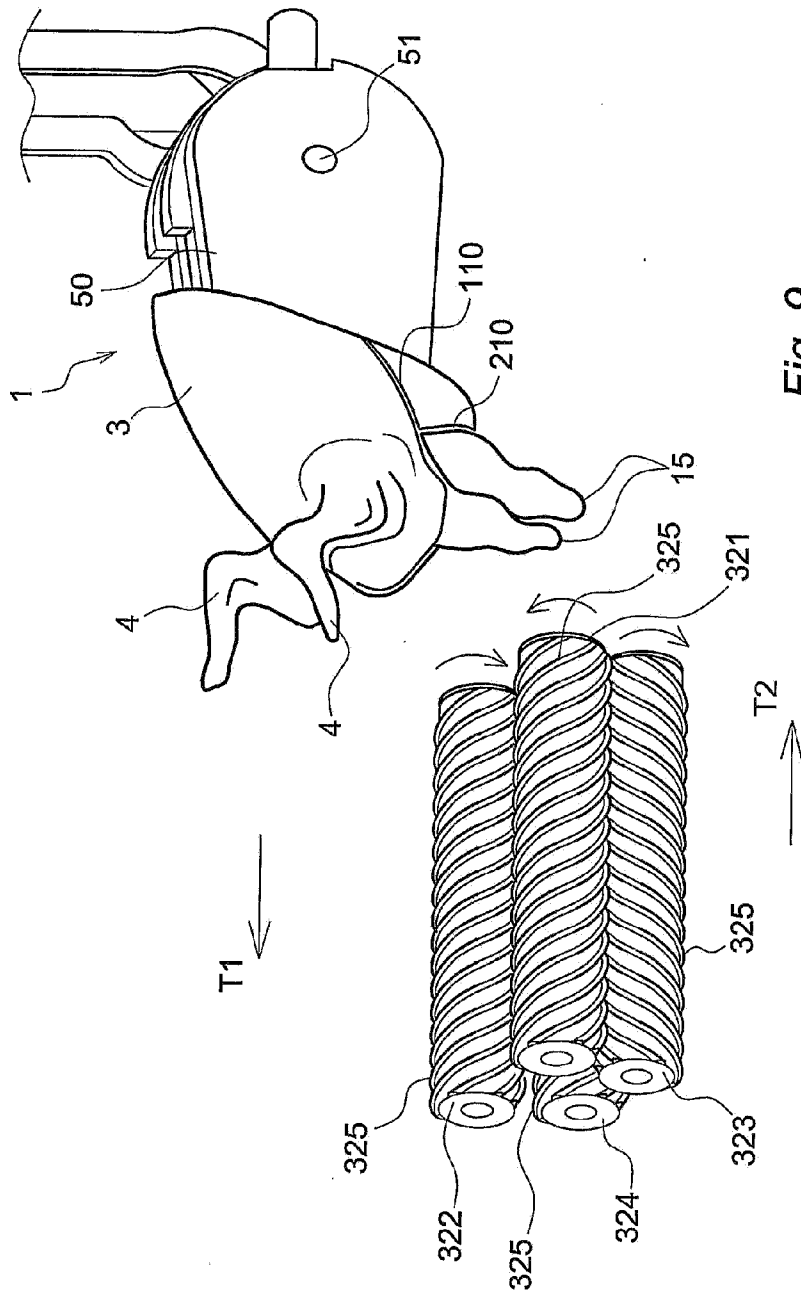


Fig. 9

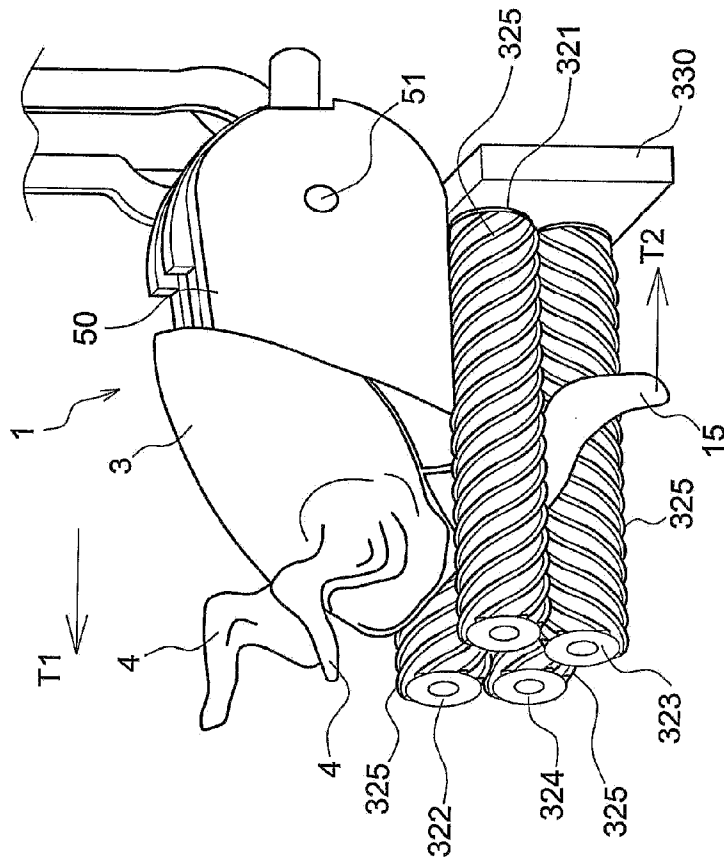
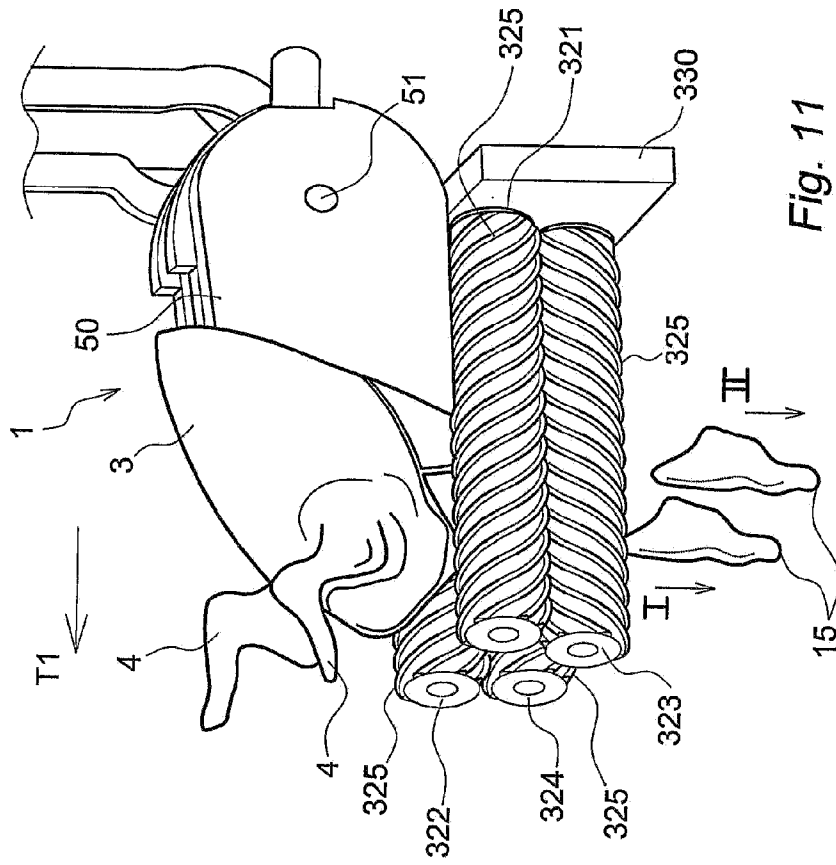


Fig. 10



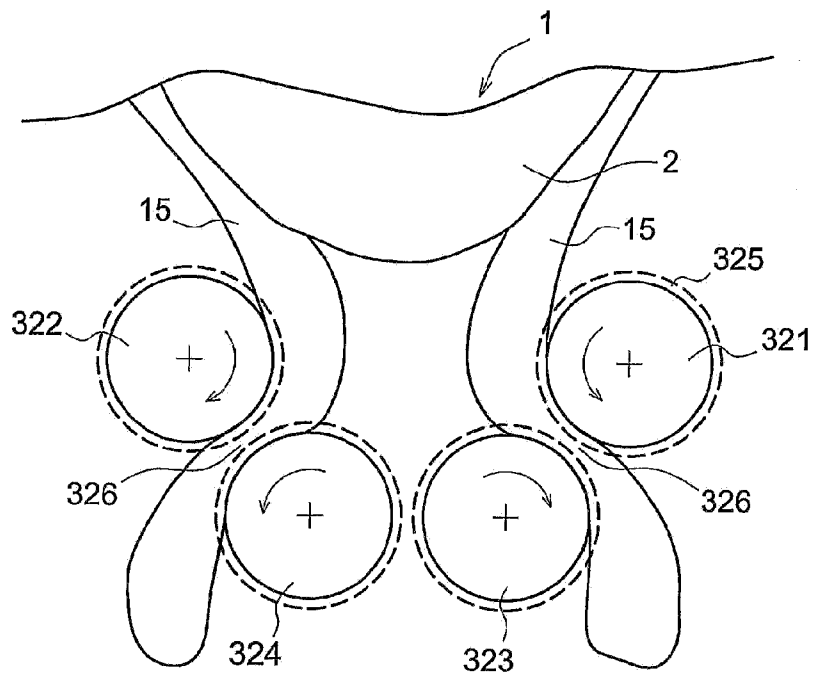


Fig. 12

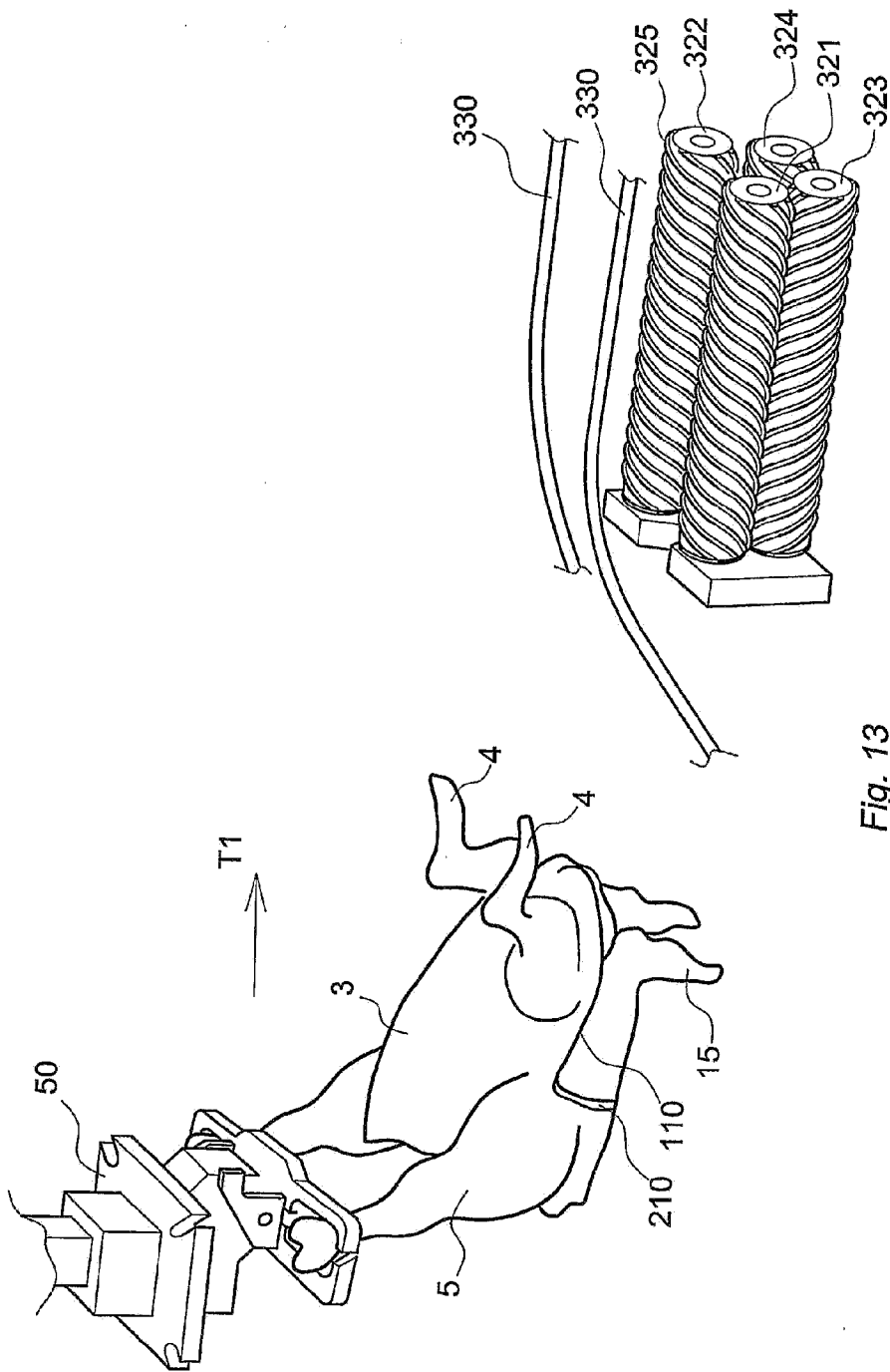


Fig. 13

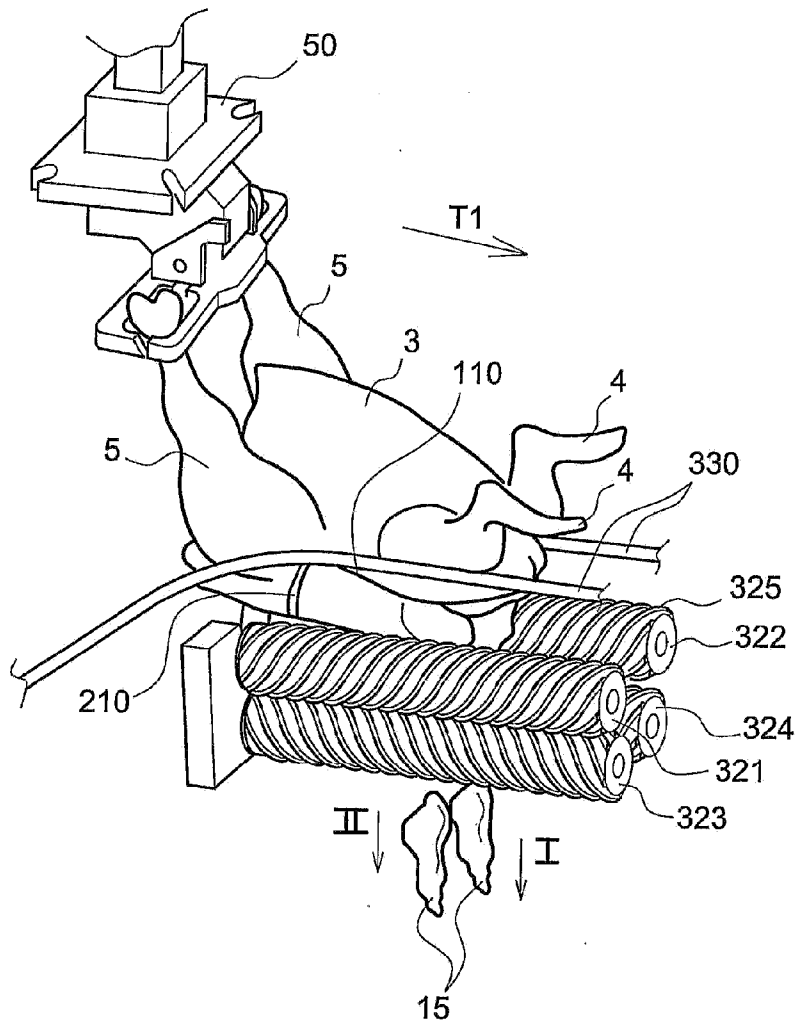
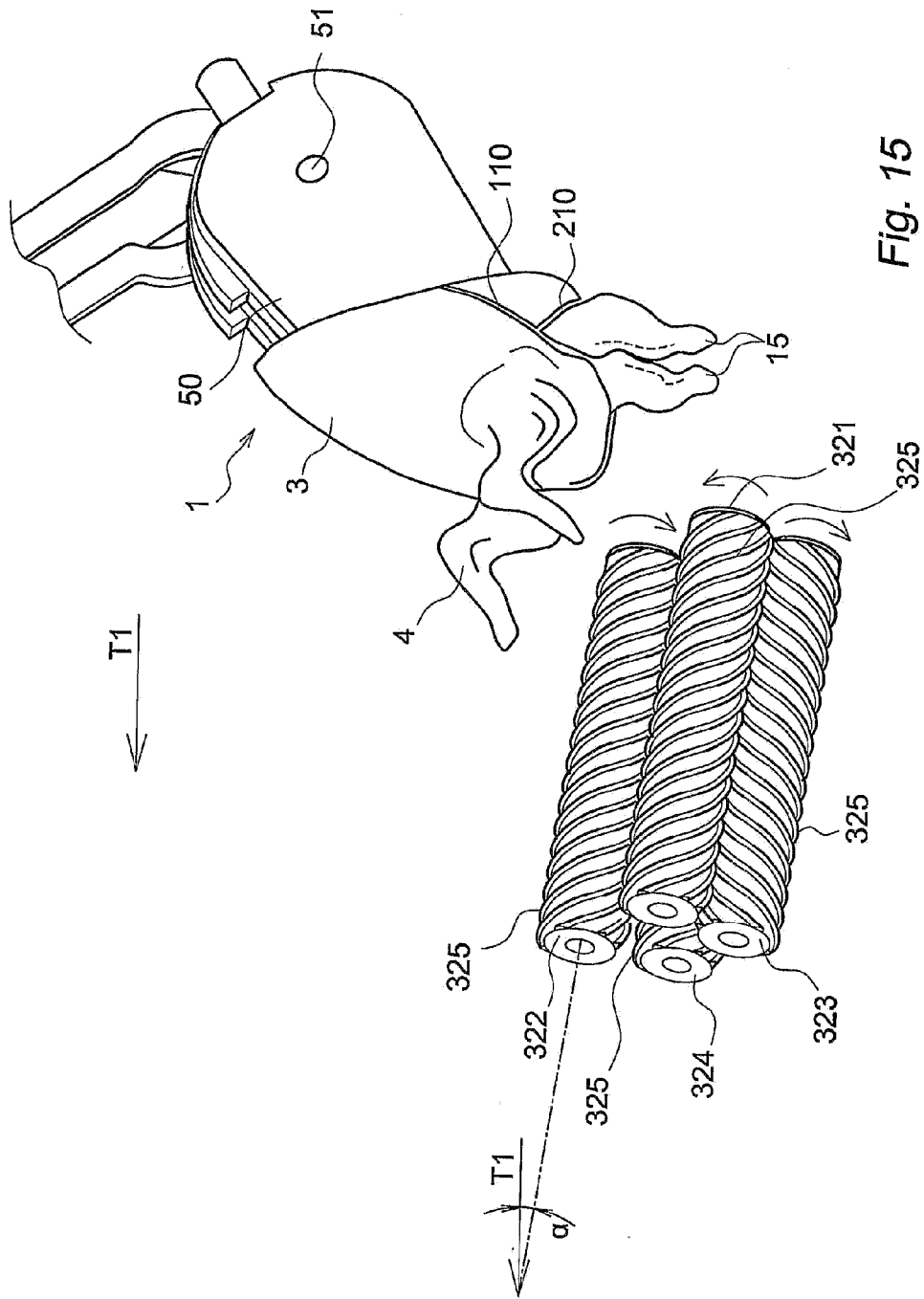
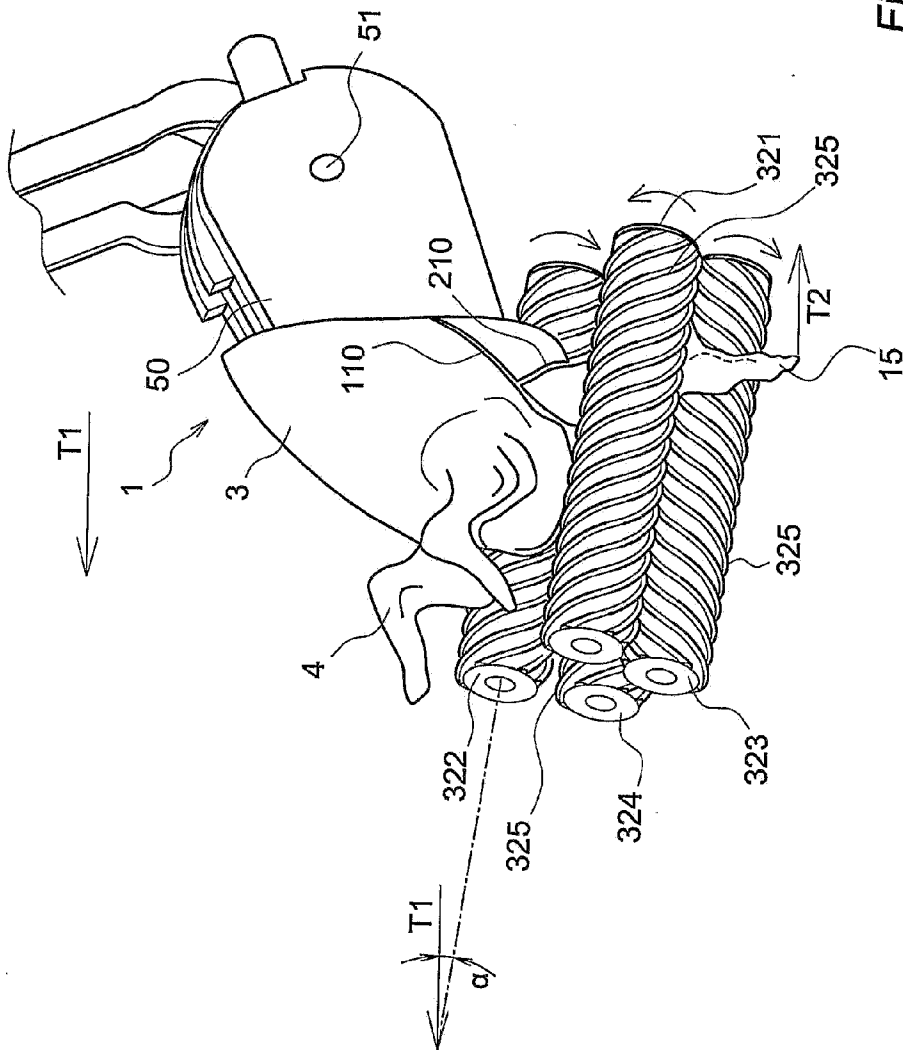


Fig. 14





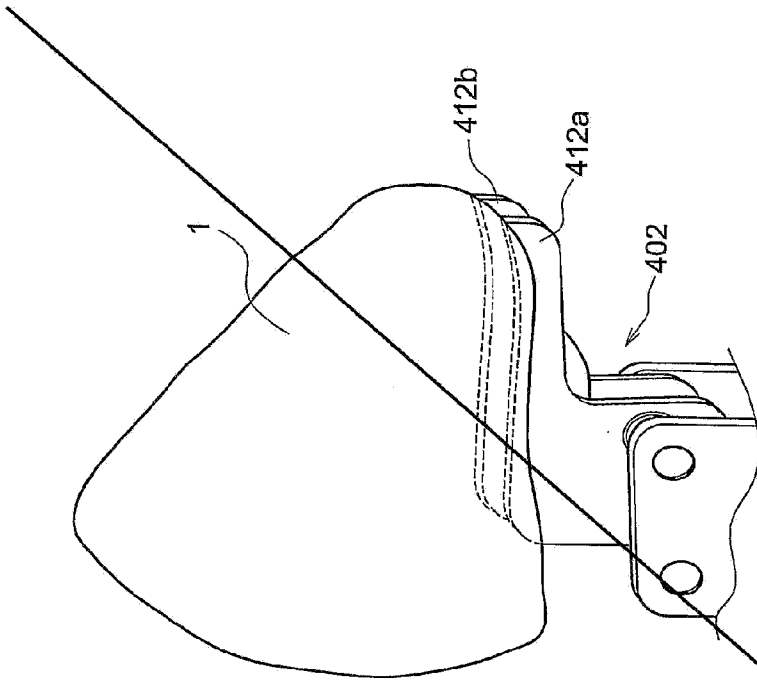


Fig. 24

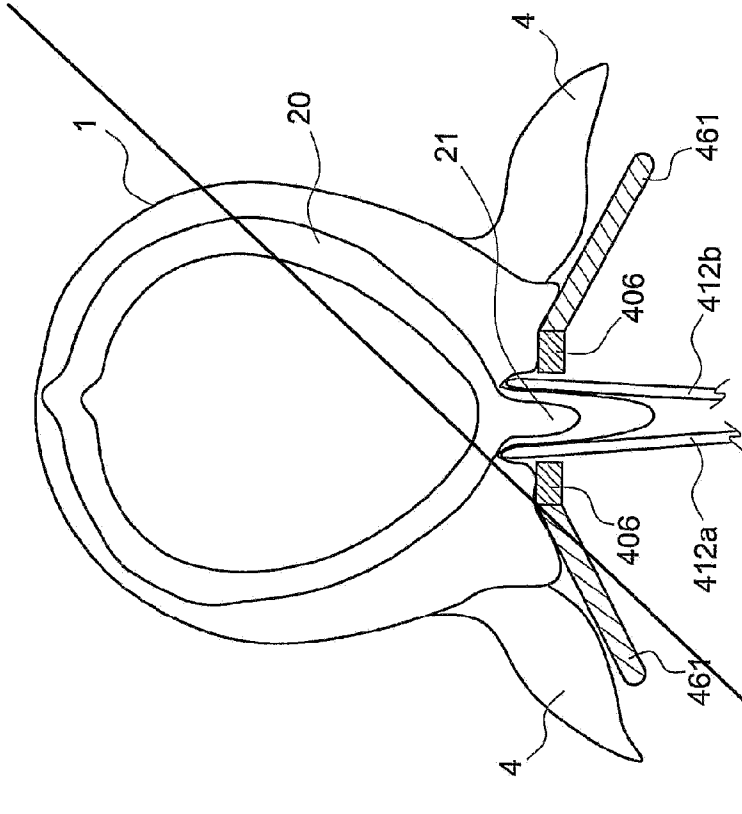
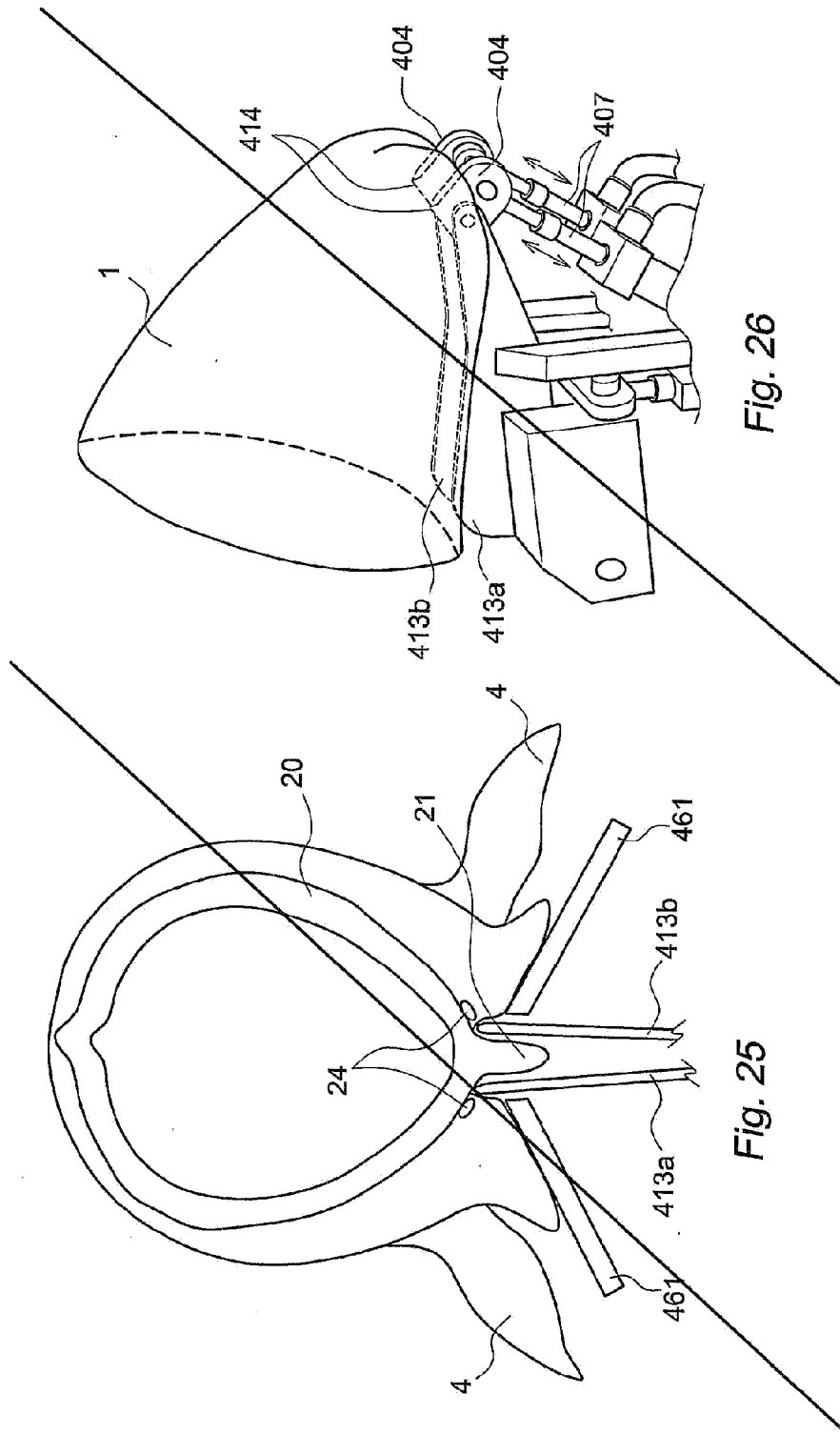


Fig. 23



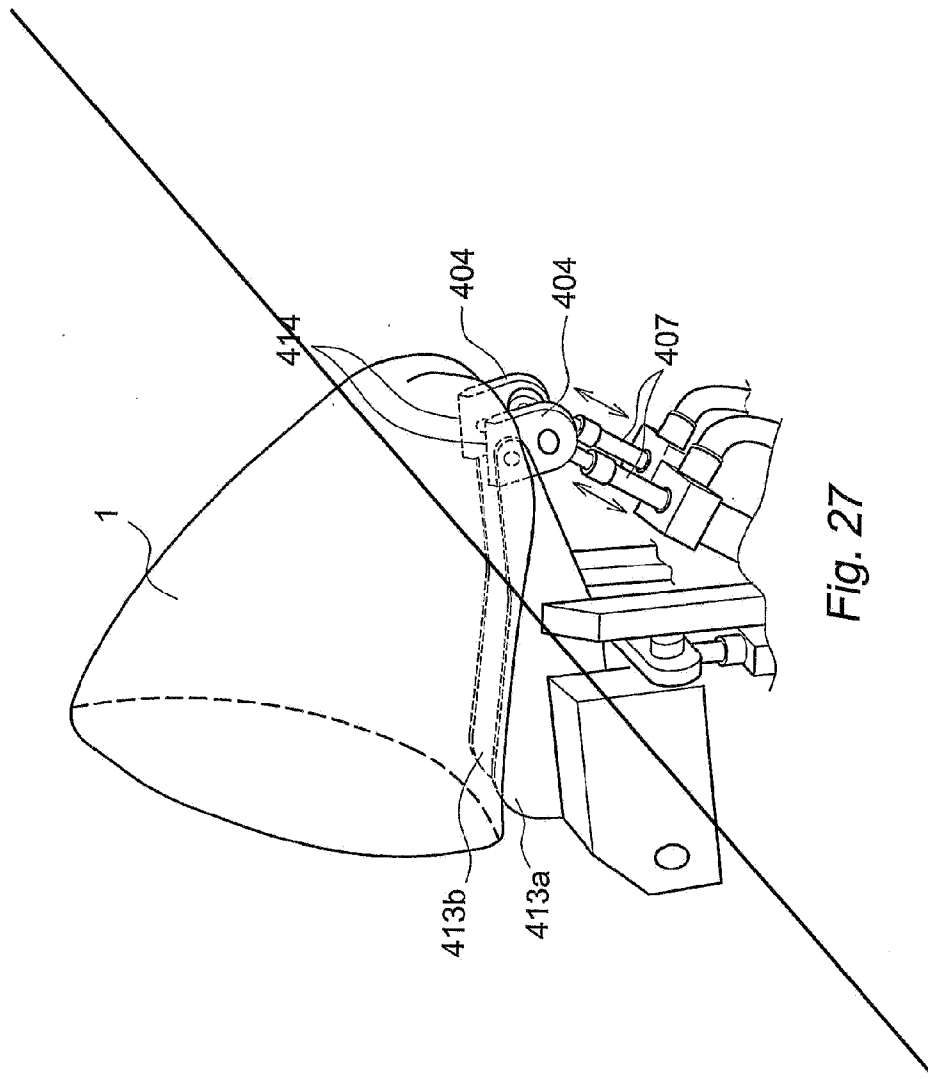


Fig. 27

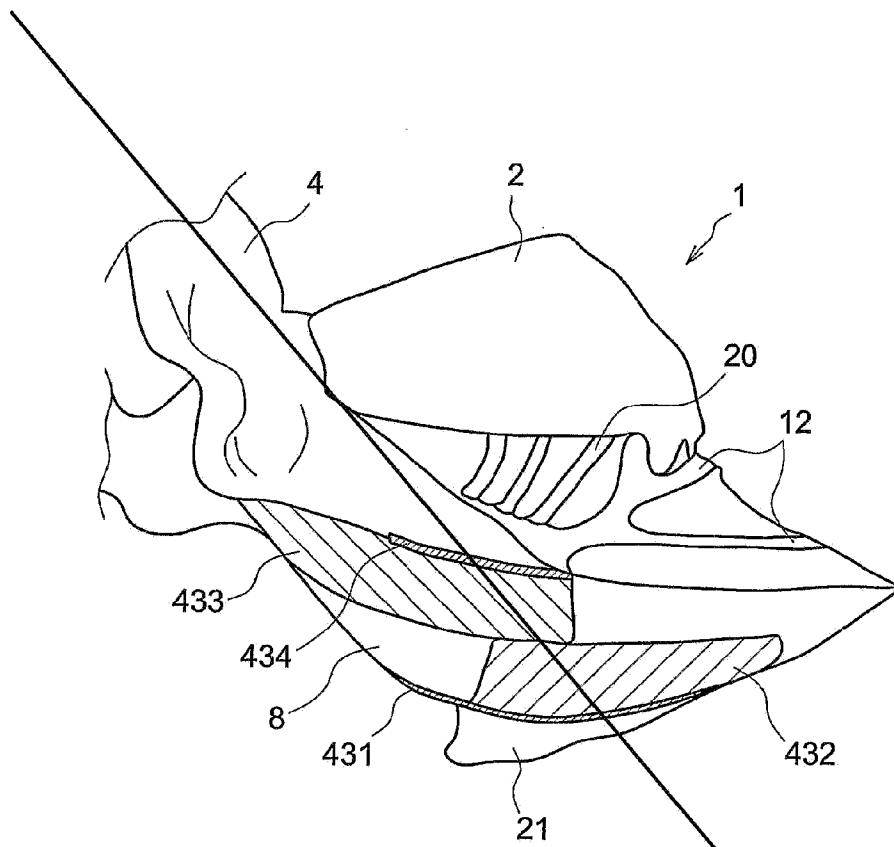
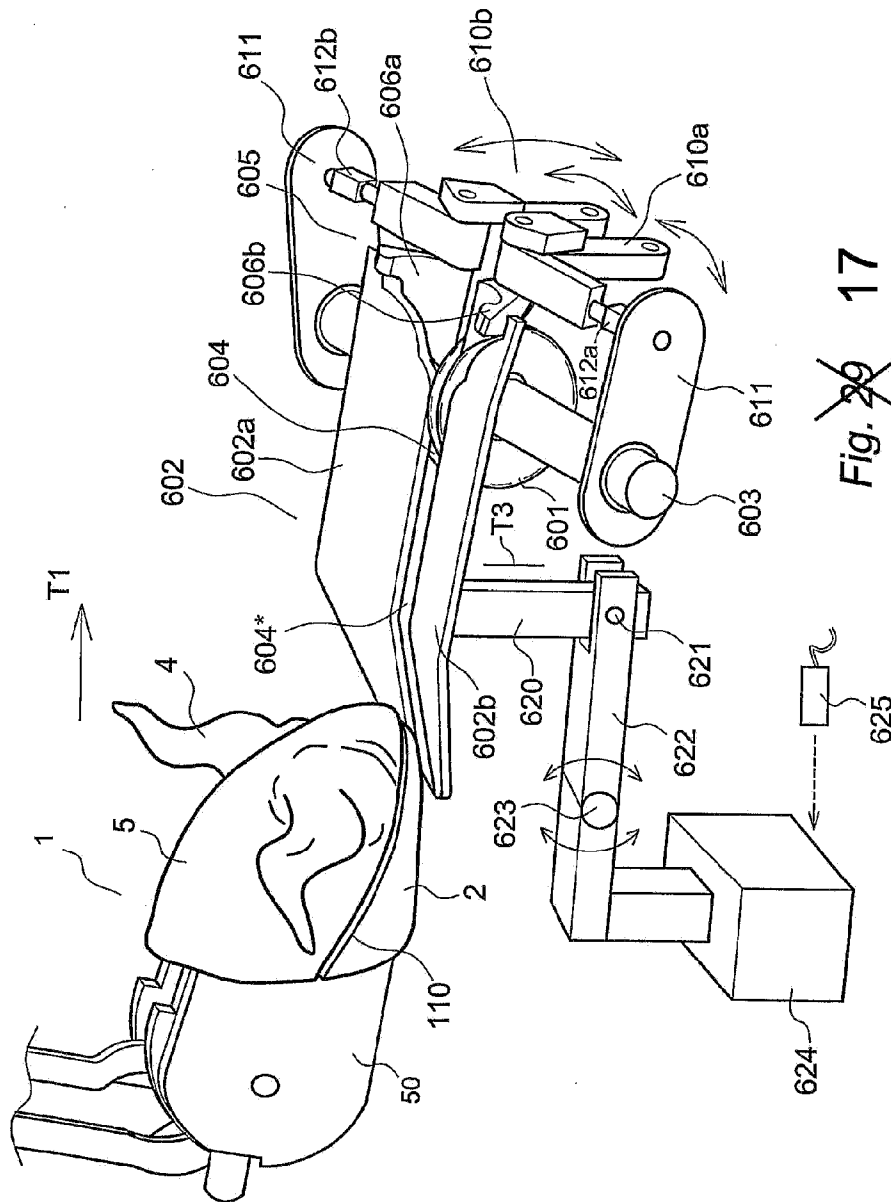
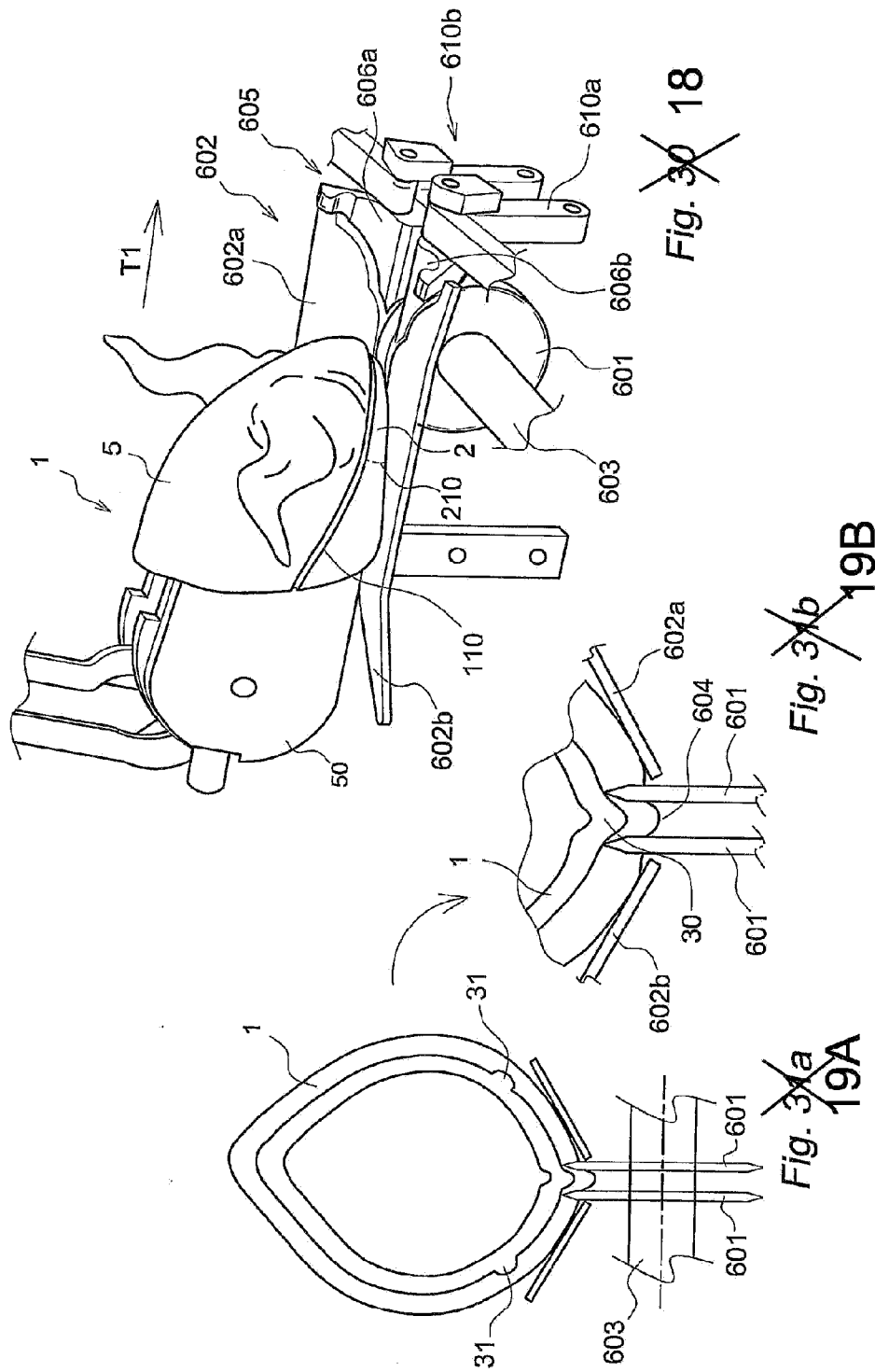
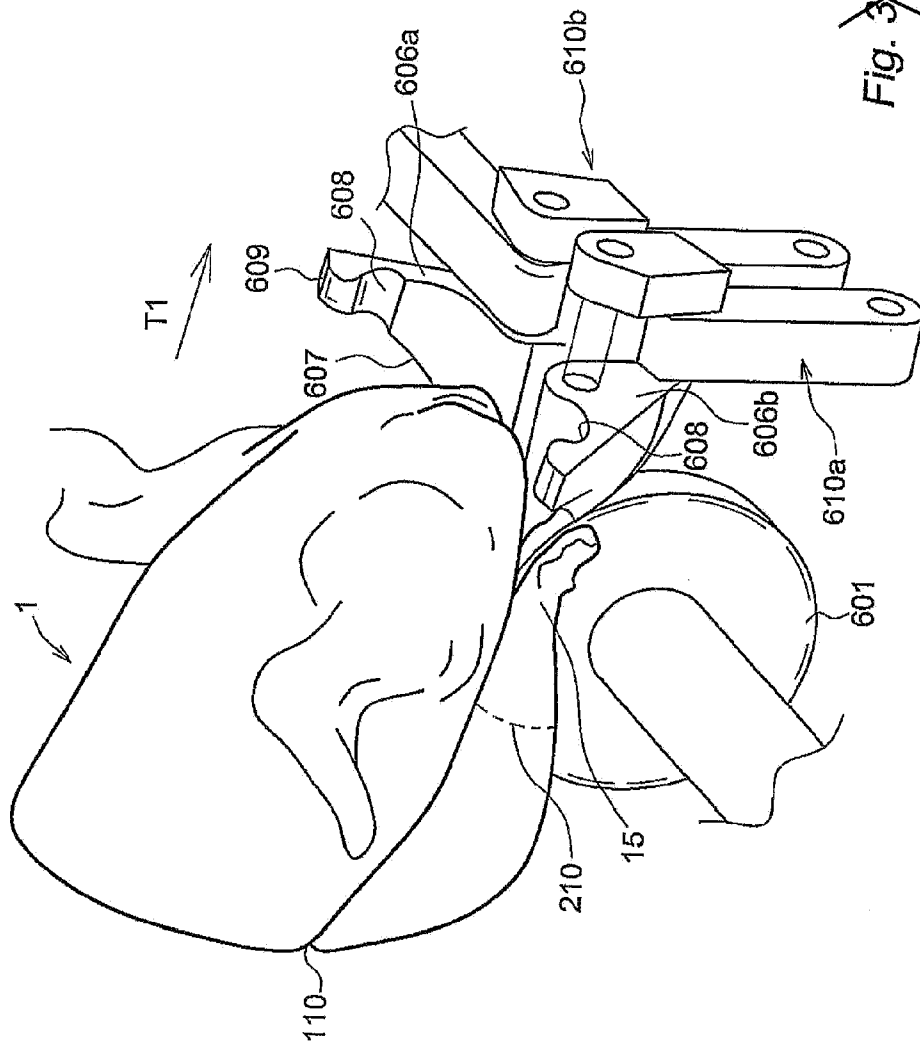


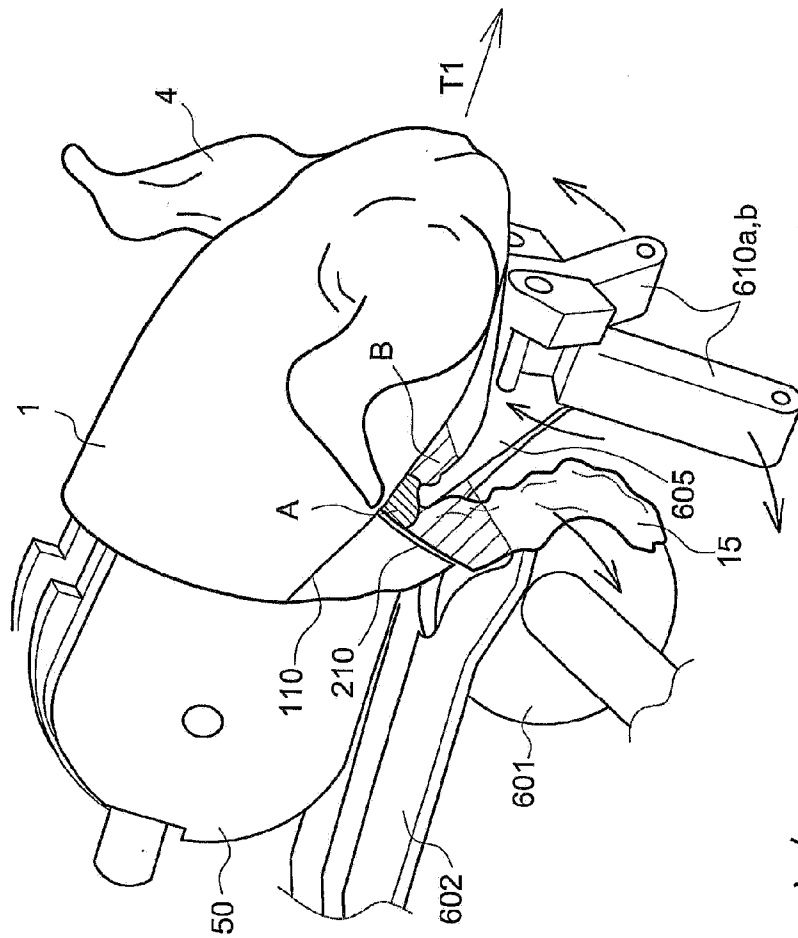
Fig. 28







~~Fig. 32~~ 20



~~Fig. 33~~ 21

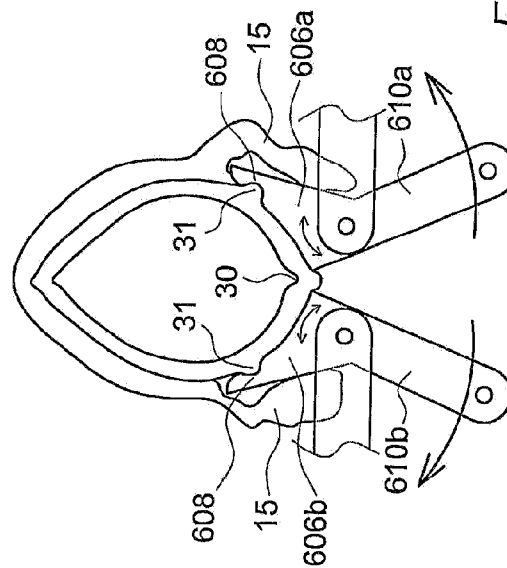


Fig. ~~34~~ 22

