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## **DESCRIPTION**

**[0001]** The invention relates to methods and devices for processing a carcass part of slaughtered poultry, which carcass part comprises at least part of the ribs and part of the meat which is naturally present thereon.

**[0002]** The modern consumer of meat products derived from poultry, in particular from chicken, has become used to a wide range of choices between a large number of high-grade products, such as inner fillets, outer fillets (single, double), drumsticks, legs and wings which have been cut in various ways. To enable consumer demand to be satisfied, processors of slaughtered poultry need a flexible method and device for processing a carcass part of slaughtered poultry which allows consumer demand for high-quality products to be efficiently satisfied.

**[0003]** For slaughtered poultry to be divided into parts which are attractive to the consumer, it is traditional for the poultry to be supplied to a dividing line. In this line, the poultry is hung by its legs from a suitable hook of a conveyor system which is guided past a number of processing stations.

**[0004]** A known dividing line generally comprises a station in which the front half of the carcass (comprising the breast and that part of the back which directly adjoins it) and the back half of the carcass (which comprises the legs and that part of the back which connects the legs) are separated from one another. The back half of the carcass is processed further in the dividing line still hanging by its legs, while the front halves are transferred to a separate filleting line to be processed further.

**[0005]** Traditionally, the neck and the neck skin are separated from the carcass while it is still in the dividing line. Where the wings are removed from the carcass part depends on how the breast meat is harvested. If the breast meat is scraped off the carcass part, the wings are removed in the dividing line. In another method used to harvest breast meat, force is exerted on the wings in order to pull the breast meat off the carcass part. The wings are then cut or pulled off the breast meat. With this method, wings and breast meat are therefore separated from one another in the filleting line.

**[0006]** With a view to efficiency and flexibility, it is desirable for it to be possible for processing operations such as wing cutting (in its different variants) and the removal of the neck and/or neck skin also to be carried out in the filleting line.

**[0007]** NL-1014845 describes a device for processing a slaughtered poultry product which comprises product carriers which are secured to an overhead conveyor. This known device for processing a slaughter product comprises a conveyor which can move along a path and to which a first body, which can rotate about a first axis, is connected. A second body, which can rotate about a second axis, is connected to the first body. A first actuating device sets various first angular positions of the first body with respect to the first axis, while a second actuating device sets various second angular positions of the second body with respect to the second axis. A locking device fixes the first and/or second angular position. The locking device is actuated by actuating cams situated near the second axis. The actuating cams can be operated in different angular positions of the first body and the second body. A slaughter product fixing device connects a breast portion of the slaughter product to the second body. The description of NL 1014845 is incorporated by reference herein.

**[0008]** Both front halves and breast caps, with or without wings, parts of wings, the neck, the neck skin and/or the backbone, can be applied to a product carrier of this type. This known product carrier guides the carcass part fixed to it past a number of processing stations, it also being possible for the carcass part to be moved into a position with respect to each of the processing stations as if the carcass part were to be hanging from a hook belonging to a dividing line. This way, the product carrier can be regarded as a prosthesis for the back half while the carcass part is transported, as the product carrier of the type of NL-1014845 takes over the function of the back half in traditional dividing lines. This has the advantage that processing devices which could previously only form part of the dividing line can now also be integrated into the filleting line.

**[0009]** In practice, it has been found that the possibility of carrying out operations which hitherto had to be carried out in the dividing line, or which it was at least greatly preferred to carry out in the dividing line, in the filleting line offers possibilities with a view to optimizing the processing of a carcass part which comprises at least part of the ribs and part of the meat which is naturally present thereon.

**[0010]** However, not all the optimizations which have been developed require the use of a product carrier as described in NL 1014845. Even simpler product carriers, for example product carriers which can only be pivoted in a single plane, may be adequate. In addition, it is also the case that methods and devices according to the invention can be used without being expressly combined with a product carrier which is moving along a path. In this context, consideration can be given, for example, to their use in a stand-alone machine or a device in which the product which is to be processed is moved past the device by hand. Any

optimization which has been developed may be applied as such, possibly in combination with a prior art method or device. It is also envisaged that two or more optimizations are combined.

**[0011]** The object of the invention is to make use of the possibilities for optimizing the processing of a carcass part of slaughtered poultry. This allows high production speeds, a high yield and a high quality of the products to be achieved. There is also a greater degree of flexibility with regard to the shape, dimensions and weight of the carcass part which is to be processed, as well as more flexibility in terms of the end product which can be achieved.

**[0012]** This object is achieved by a first method not according to the invention for processing a carcass part of slaughtered poultry, which carcass part comprises at least part of a rib cage, meat which is naturally present on said rib cage, a neck opening, and a wing joint, the carcass part having an interior, which method comprises the following steps:

- applying and fixing the carcass part to a product carrier, which product carrier is moveable and which product carrier engages the interior of the carcass part,
- moving a wing-joint positioning member via said neck opening into the interior of the carcass part, the wing-joint positioning member being provided with one or more wing-joint positioning surfaces, which are arranged in such a manner that, in a defined position of the first wishbone blade with respect to the carcass part, the wing-joint positioning surfaces hold said wing joint into a predetermined position,
- exerting an internal pressure on the carcass part, in such a manner that said one wing joint is supported in the predetermined position by a wing-joint positioning surface of the first wishbone blade.

**[0013]** The method for positioning the wing joints can successfully be applied to carcass parts without a wishbone. In cases in which the wishbone is present but does not have to be cut loose, the wing-joint positioning member is also suitable for use. In those cases, the wing-joint positioning member functions as a support for the wing-joint positioning surfaces. The use of a wing-joint positioning member positions the wing-joint reliably and reproducibly to enable accurate processing of the wing joint, such as the formation of an incision through the wing-joint without damaging the bones of the joint in the process.

**[0014]** However, in many cases, a wishbone or part of a wishbone has to be removed or at least cut loose from the carcass part. To cut the fragile wishbone loose from the carcass part, the wing-joint positioning member is in those cases preferably provided with a suitable cutting edge. It has been found that the operation of cutting loose the wishbone (or a part of the wishbone) can be successfully combined with an accurate processing operation of the wing joint, such as the formation of an incision through the wing joint without damaging the bones of the joint in the process when such a wing-joint positioning member with a suitable cutting edge is applied.

**[0015]** Before being processed, the carcass part which is to be processed is applied and fixed to a product carrier. The product carrier which is known from NL 1014845 is particularly suitable for this purpose. This product carrier moves the carcass part which is to be processed into the correct orientation with respect to a first processing device. Accurate processing of the wing joint is carried out in this first processing device, and if appropriate the wishbone or that part of the wishbone which is present is cut loose and if appropriate removed from the carcass part.

**[0016]** The wing-joint positioning member is moved into the carcass part via the neck opening. If products with a neck or neck skin are being processed, it is advantageous first of all to move the neck and/or neck skin away from the neck opening, so that it is successfully cleared and the wing-joint positioning member can be introduced into the interior of the carcass without problems. One or more wing-joint positioning surfaces are arranged on the wing-joint positioning member. When the wing-joint positioning member is being displaced into position with respect to the carcass part, the one or more positioning surfaces act to move the wing-joint substantially into a predetermined position, for example by pushing the wing-joint slightly outwards. In this way, the overall positioning of the wing-joint is realized from interior of the carcass.

**[0017]** To realize accurate positioning of a wing joint, after the wing joint has been moved into position from the interior of the carcass part, an external pressure is exerted on the carcass part by pressure-exerting means. These pressure-exerting means ensure that the wing joint comes to bear firmly against said wing-joint positioning surface, in such a manner that it reliably comes to lie in the predetermined position.

**[0018]** The combination of positioning the wing joints from the interior and from the outside of the carcass part has the advantage that the position of the wing joints with respect to the processing device is reliably, accurately and unambiguously

defined, and also that the position of the wing joint with respect to the processing device is largely independent of the size, weight and shape of the carcass part to be processed.

**[0019]** In the case of a relatively small or medium-sized, ideally shaped carcass part, in which each wing joint is located at a relatively short distance from the location of the backbone, each wing joint will be pushed outwards, towards the predetermined position, by a wing-joint positioning surface. In these cases, the wing joint will already bear firmly against a wing-joint positioning surface and will adopt the position which is prescribed by this surface. In these cases, pressing on the carcass part from the outside primarily constitutes an additional guarantee that the wing joint will retain its ideal position with a sufficient accuracy during a processing operation.

**[0020]** In the case of a relatively large or less ideally shaped carcass part, there is no guarantee that a wing joint will immediately be positioned as intended by acting on it from the inside of the carcass part by a wing-joint positioning surface of the wing-joint positioning member. In such cases, the wing joint will not always immediately bear correctly against the associated wing-joint positioning surface. The wing-joint positioning surface is then merely responsible for overall preliminary positioning of the wing joint. The pressure-exerting means then apply a preferably targeted pressure to the carcass part from the outside, with the result that each wing joint still comes to bear correctly against its associated wing-joint positioning surface, so the wing joints reach the predetermined position with a high degree of accuracy.

**[0021]** Since the position of the wing joints is thus accurately known and largely independent of the size and shape of the carcass part, it is possible for processing operations on the wing joints to be carried out accurately.

**[0022]** One example of such a processing operation is that of cutting through some of the connecting tendons between a wing (or wing part) and the other parts of the carcass part, in such a manner that at least one connecting tendon between an outer fillet and a wing or wing part remains intact. The operation of reliably and reproducibly cutting through the wing joint at least largely without damaging the bones of the joint is another example of such a processing operation which is possible on account of accurate positioning of the wing joint.

**[0023]** These two processing operations can be combined by the use of special wing-cutting blades which are substantially sickle-shaped. These blades are provided with a facet which prevents the tendons from slipping off the wing-cutting blade during the cutting operation.

**[0024]** To make a wing joint incision of this nature, the sickle-shaped wing-cutting blades are preferably rotated or moved in some other way such that they come to lie around the wing joint. During the rotary motion, the meat and tissue around the wing joint is already being cut into. Then, the wing-cutting blades are moved further, with the result that the wing-cutting blades are pulled further through the joint. During this further movement, each wing-cutting blade at a given moment comes into contact with the tendon located inside of the joint. The continuing movement severs the tendons, with the facet of the wing-cutting blade preventing the tendon from sliding off the wing-cutting blade.

**[0025]** Control means of the wing-cutting blades are preferably adapted to allow to determine whether or not the wing-cutting blades execute the wing joint incision for each passing product.

**[0026]** In a preferred embodiment in which the wing cutting is carried out using the special wing-cutting blades mentioned above and a connecting tendon between the outer fillet and wing (part) remains intact, it is possible to harvest both the breast fillet, the eye meat, the second fillet and the inner fillets in an advantageous way.

**[0027]** It is in this way possible to carry out the method of harvesting second fillets as described in EP 0 695 506.

**[0028]** The first method not according to the invention can be carried out by a device. It is preferable for a plurality of these devices to be accommodated in a turret machine. The devices can be positioned either substantially horizontally or substantially vertically in a turret machine of this type.

**[0029]** A second method not according to the invention relates to an optimization of the processing of a carcass part of slaughtered poultry, which carcass part comprises at least part of a rib cage, meat which is naturally present on said rib cage, a neck opening and part of the wishbone, which method comprises the following steps:

- applying and fixing the carcass part to a product carrier, which product carrier is moveable along a path and which product carrier engages on the inside of the carcass part,
- moving a block into the carcass part through the neck opening of the carcass part, which block has a recess for receiving

the wishbone or that part of it which is present, and which block is arranged between the two limbs of the wishbone or between the locations at which these limbs would be located if the entire wishbone were present,

- cutting the wishbone or that part of it which is present loose from the carcass part on the side facing the back side of the carcass part by introducing a first wishbone blade along one side of the block, the first wishbone blade having a cutting edge, the contour of which substantially corresponds to the outer contour of the complete wishbone,
- introducing two second wishbone blades into the carcass part on either side along the block, preferably substantially perpendicular to the first wishbone blade, the second wishbone blades substantially following the outer contour of the complete wishbone, and cutting the wishbone or that part of it which is present loose from the carcass part, in such a manner that the wishbone or that part of it which is present is enclosed between the block, the first wishbone blade and the second wishbone blades,
- pulling the block, the first wishbone blade and the second wishbone blades back out of the carcass part together, in such a manner that the wishbone or that part of it which is present remains enclosed between the block, the first wishbone blade and the second wishbone blades and is thereby removed from the carcass part.

**[0030]** After the processing operation has been carried out on the wing joints which are present, it is preferable for the wishbone or that part of the wishbone which is still present to be removed from the carcass part. According to the second method not according to the invention, this is achieved by moving a block into the carcass part between the two limbs of the wishbone before the first wishbone blade is introduced. If only part of the wishbone is still present, the block is introduced into the carcass part at a position which is such that if the entire wishbone were still present the block would be located between the two limbs of the wishbone. In the block there is a recess which receives the wishbone or that part of the wishbone which is still present. A block for receiving at least part of the wishbone is known from EP 0 336 162.

**[0031]** The first wishbone blade has a preferably flat cutting part. The shape of the outer contour of this cutting part substantially corresponds to the shape of the outer contour of the wishbone, i.e. the cutting part has a substantially triangular contour. The cutting part is provided with at least one cutting edge.

**[0032]** In an advantageous embodiment of the second method not according to the invention, the cutting part of the first wishbone blade is substantially triangular in shape, with the wide side of the triangle being wider than the wishbone. As a result, not only the wishbone but also the surrounding meat is cut loose from the carcass part. This is not only of benefit to the amount of meat recovered but also ensures that this additional meat is in reality also harvested.

**[0033]** In a preferred embodiment of the second method not according to the invention, the wide side of the triangular shape of the first wishbone blade is so wide that the meat is cut loose from the carcass part as far as the immediate vicinity of the wing joint. As a result, the meat between the wishbone and the wing joint is also harvested, whereas previously it remained attached to the carcass part.

**[0034]** The first wishbone blade is arranged along one side of the block in the carcass part. As a result, the wishbone (or that part of the wishbone which is still present in the carcass part) is cut loose on the side facing the back side of the carcass part.

**[0035]** Then, two second wishbone blades are stabbed into the carcass part along the block on either side of it, substantially perpendicular to the first wishbone blade. These second wishbone blades substantially follow the outer contour of the wishbone and cut the wishbone loose from the carcass part.

**[0036]** When the block, the first wishbone blade and the second wishbone blades have been arranged in the carcass part, the wishbone is enclosed by them. The wishbone is removed from the carcass part by the block, the first wishbone blade and the second wishbone blades being pulled back simultaneously.

**[0037]** In an advantageous embodiment of the second method not according to the invention, when the block and the first and second wishbone blades are moved out of the carcass part, they move apart, and the wishbone is then removed from the block e.g. by the use of compressed air. Water can also be used as an alternative to compressed air, or alternatively mechanical means can be employed.

**[0038]** If products with a neck or neck skin are being processed, it is advantageous first of all to move the neck and/or neck skin away from the neck opening, so that the neck opening is successfully cleared and the first wishbone blade can be introduced in the carcass part without problems. More generally, preferably the neck opening is cleared before performing an operation on the wishbone or a part thereof which is present. Under "clearing of the neck opening" a removal of skin and/or crop fat and/or other

tissue is to be understood.

**[0039]** In a further advantageous embodiment, the processing according to the second method not according to the invention is carried out in a turret machine. The production rate can be considerably increased in this way, since a plurality of products are processed simultaneously and continuously. In a traditional system, it is possible to process some 2300 products per hour, whereas with the method according to the invention the production rate is approximately 3000 products per hour or above, and when the method according to the invention is used in a turret machine it is possible to achieve production rates of 5000 products per hour.

**[0040]** In some areas, there is a demand for products in which the wishbone is still present, albeit partly cut free from the meat. Products of this type can also be produced with the aid of the method and device according to the second method not according to the invention. In such a case, the first wishbone blade partly cuts loose the wishbone but the operation of introducing the second wishbone blades is omitted. Also, in this case the wishbone is not removed from the carcass part.

**[0041]** The second method not according to the invention can be carried out in a device It is preferable for a plurality of these devices to be accommodated in a turret machine. The devices can be positioned either substantially horizontally or substantially vertically in a turret machine of this type.

**[0042]** According to a third method not according to the invention, the processing of a carcass part of slaughtered poultry, which carcass part comprises at least part of a rib cage, which is naturally present on said rib cage on both the breast side and the back side, the carcass part having an interior, is further optimized by a method which comprises the following steps:

- applying and fixing the carcass part to a product carrier, which product carrier is moveable along a path and is preferably pivotable in a plurality of planes with respect to this path, and which product carrier engages the interior of the carcass part,
- making two incisions in the meat on the back side of the carcass part, which incisions extend on either side of the backbone or the location in the carcass part where the backbone was located before being removed, and run substantially parallel thereto,
- loosening the back and shoulder meat from the bone parts of the body of the carcass part, in such a manner that a connection between the back and shoulder meat, on the one hand, and the breast meat - which is still connected to the bone parts of the body of the carcass part - on the other hand continues to exist, the back and shoulder meat being removed by the use of scraper means which initiate scraping from the incisions which have already been made on either side of the backbone,
- removing the breast meat from the bone parts of the body of the carcass part, in such a manner the breast, back and shoulder meat is all still joined together when it is removed in its entirety from the bone parts of the body of the carcass part.

**[0043]** Hitherto, the known methods have substantially harvested the breast meat as a fillet. The back and shoulder meat, which is much more difficult to remove, remained behind on the bone parts of the body of the carcass part and was often harvested later, in pieces, separately from the breast meat. Consequently, the back and shoulder meat had to be sold at a lower price than the breast meat, whereas its quality is equally good.

**[0044]** In addition, when the fillet is being pulled off using the method which has been known hitherto, meat often remains behind on the bone parts of the body of the carcass, while bone parts often come off with the meat which has been pulled off. The third method not according to the invention greatly improves this situation.

**[0045]** According to the third method not according to the invention, the back and shoulder meat is now harvested in such a manner that it remains connected to the breast meat, so that the entire unit comprising breast, back and shoulder meat can be sold as a fillet. It is preferable for the third method not according to the invention to be combined with a preferred embodiment of the second not according to the invention, in which the eye meat is also harvested. This results in the formation of a large fillet which comprises breast meat, back meat, shoulder meat, eye meat and the second fillet.

**[0046]** To enable large fillets of this type to be harvested, first of all two long incisions are made in the back meat, substantially parallel to and on either side of the backbone. These incisions can be made, for example, using rotating blades. When making these incisions, it is preferable to prevent bone parts of the body of the carcass part from being touched by the blades.

[0047] Resiliently mounted scraper means are arranged on both sides of the carcass part. They start scraping during the cutting along the backbone as soon as the wing joints have passed the scraper means. While the carcass part is passing the scraper device, the resiliently mounted scraper means follow the contour of the carcass part and in this way detach the back and shoulder meat from the bone parts of the body of the carcass part. The connection between breast meat, on the one hand, and back and shoulder meat, on the other hand, is maintained.

[0048] In an advantageous embodiment in which at least the first method not according to the invention and the third method not according to the invention are combined with one another, the scraper means preferably begin scraping both from the incisions along the back bone and from the wing-joint incisions.

[0049] It is preferable for the scraper means to be actuated pneumatically as soon as the wing joints have passed.

[0050] The form of the scraper means is preferably such that they keep the meat which has been scraped off away from the bone parts of the body of the carcass part. In this way, a space is formed between the bone parts of the body of the carcass part and the back and shoulder meat. This space is used to make an incision, using a small blade, which is preferably mounted resiliently and is preferably secured to a guide, beneath the shoulder blade. During the removal of the fillet, which comprises breast meat, back meat, shoulder meat and preferably also eye meat and the second fillet, from the bone parts of the body of the carcass part at a later stage, this incision functions as an initiation point for the separation of fillet and bone parts of the body.

[0051] When using the third method not according to the invention, it is also possible to harvest fillets on which the skin is still present. This increases the overall efficiency which can be achieved using the method.

[0052] The third method not according to the invention can be carried out in a device.

[0053] According to the invention, the processing of a carcass part of slaughtered poultry, which carcass part comprises at least part of a rib cage, part of the meat which is naturally present on said rib cage and part of at least one of the wings, the carcass part having an interior, is further optimized by a method which comprises the following steps:

- applying and fixing the carcass part to a product carrier, which product carrier is moveable along a path and is preferably pivotable in a plurality of planes with respect to this path, and which product carrier is adapted to engage the interior of the carcass part,
- positioning the carcass part in such a manner that the longitudinal axis of the carcass part is located substantially vertically and substantially perpendicular to the conveying direction of the product carrier, and the wings or wing parts which are present hang downwards, substantially in the direction of the longitudinal axis of the carcass part,
- introducing the hanging wings or wing parts between horizontal guides, which extend substantially in the conveying direction of the product carriers,
- retaining the wings or wing parts which are present while the product carrier conveys the bone parts of the body of the carcass part onwards, with a first incision being made at the same time at the start of the wings, in such a manner that the wings or wing parts which are present remain connected to the breast meat which is present on the carcass part,
- increasing the distance between the wings or wing parts which are present and the bone parts of the body of the carcass part by exerting a force on the wings or wing parts which are present, in such a manner that the fillet, which comprises breast meat, back meat, shoulder meat and possibly eye meat, and the wings or wing parts which are present are together pulled off the bone parts of the body of the carcass,
- conveying the set comprising fillet and the wings or wing parts which are present in the downwards direction,
- separating the fillets and the wings or wing parts which are present at a location below the level at which the processing of the products begins,
- discharging fillets and wings, at a location below the level at which the processing of the products begins.

[0054] An advantageous way of harvesting fillets from carcass parts of slaughtered poultry is known from EP 0 551 156. The method of harvesting fillets described in this document is suitable for carcass parts which comprise at least part of one of the wings.

[0055] During the harvesting of the fillets in the known way, the wings or wing parts which are present are retained while the bone parts of the body of the carcass part are conveyed onwards. In this method, a first incision is also made at the wing joint.

The application of a force to the wings or wing parts which are present, which force is directed away from the carcass part, and an increase in the distance between the bone parts of the body of the carcass and the wings or wing parts causes the fillet to be pulled off the bone parts of the body of the carcass. As the last step, the wings are separated from the breast fillets.

**[0056]** In the known device, the carcass parts are introduced into the processing device in a position which was hitherto customary in filleting lines, specifically with the longitudinal axis of the carcass part oriented substantially vertically and the neck opening facing upwards. However, this has the drawback that in the processing device for carrying out this method the location where the wings are retained and cut into, the location where the wings are separated from the fillets and the location where the wings and the fillets are discharged from the processing device have to be relatively close together. This inevitably leads to design compromises.

**[0057]** When using a product carrier as described in NL 1014845, it is possible for the product to be introduced into the processing device "on its head". This makes it possible for the wings to be pulled downwards away from the bone parts of the body of the carcass part, instead of having to be pulled away upwards, in the manner which is known from EP 0 551 156.

**[0058]** The operation of discharging the fillets and the wings or wing parts is carried out by allowing the fillets and the wings or wing parts to drop onto a conveyor belt. This conveyor belt therefore has to be arranged beneath the point at which the fillets and the wings or wing parts are separated from one another. In the known device, this point had to be located above the point at which the products enter the processing device. This leads to design problems on account of the lack of space.

**[0059]** In the method according to the invention, it is possible for the conveyor belt to be positioned beneath the complete processing device. As an additional advantage, it is also possible to considerably increase the distance over which the fillet is pulled off the bone parts of the body of the carcass part.

**[0060]** The invention also relates to a device for carrying out the method in accordance with the invention.

**[0061]** Devices and methods in accordance with various aspects of the invention and methods and devices not according to the invention will be explained in more detail below with reference to the appended drawing, which shows non-limiting exemplary embodiments and in which:

Fig. 1 - shows an example of a product carrier which is suitable for use in the invention.

Fig. 2 - shows the way in which a carcass part is arranged on the product carrier shown in Fig. 1,

Fig. 3 - shows the stretching of the wings of a carcass part,

Fig. 4 - shows part of an example of a device suitable for use in the first method not according to the invention,

Fig. 5 - shows wing-cutting blades suitable for use in the first method not according to the invention

Fig. 6 - shows devices, suitable for use in the first or second method not according to the invention, accommodated in a turret machine,

Fig. 7 - shows devices, suitable for use in the first or second method not according to the invention, accommodated in an alternative machine,

Fig. 8 - shows an example of part of the device, suitable for use in the second method not according to the invention

Fig. 9 - shows an example of part of the device suitable for use in the second method not according to the invention

Fig. 10 - diagrammatically depicts a possible embodiment of the third method not in accordance with the invention,

Fig. 11 - shows a possible embodiment of the device suitable for use in the third method not in accordance with the invention

Fig. 12 - shows a possible embodiment of the device in accordance with the invention,

Fig. 13 - shows a detail from Fig. 12,

Fig. 14 - shows a device for removing crop fat and/or neck skin,

Fig. 15 - shows a possible embodiment of a device for preparing for the harvesting of second fillets,

Fig. 16 - shows the manual harvesting of second fillets,

Fig. 17 - shows the automatic harvesting of second fillets,

Fig. 18 - shows a possible embodiment of the way in which parts are cut off the carcass part.

**[0062]** Fig. 1 shows an example of a product carrier 2 which is suitable for use in the invention and in the first, second and third method not according to the invention. This product carrier 2 is designed to support and retain the carcass part 1 which is being processed. The product carrier 2 is designed to move along a path. This is realized, for example, by securing the product carrier 2 to an overhead conveyor.

**[0063]** The product carrier 2 shown in Fig. 1 is pivotable in a plurality of planes, for example as indicated by arrow A and arrow B. The product carrier 2 can execute these movements either separately or in combination, while it is being conveyed along the path. The product carrier 2 also comprises an engagement surface 4, by means of which the product carrier 2 engages on the interior of the carcass part 1, i.e. on the inside of the rib cage (or that part of it which is present in the carcass part 1). The product carrier 2 also has a fixing means 3 which retains the carcass part 1 on the product carrier 2 irrespective of the position which the latter adopts.

**[0064]** Fig. 2a and 2b show the way in which a carcass part 1 is applied to the product carrier 2. Fig. 2c shows a front half which has been applied to the product carrier 2, but other types of carcass parts can also be processed. In this context, consideration may be given, for example, to a variation in types of front halves (with complete wings, with wings without their tips, with wings with second-part incision, without wings, with neck, with neck skin, etc.), breast caps, carcass parts without backbone, etc. The carcass parts which are to be processed, before being processed, in each case comprise at least part of the ribs and part of the meat which is naturally present thereon.

**[0065]** As soon as the carcass part 1 has been applied and fixed to the product carrier 2, it can successively undergo various processing operations, which ultimately involve various parts of the carcass part 1 being separated.

**[0066]** Prior to the processing operations, the product carrier 2 can guide the carcass part 1 which is to be processed through a wing-stretching module. This has the advantage that after having passed this module all the wings or wing parts which are present are hanging in a more or less reproducible position with respect to the carcass part 1. Carcass parts without wing parts are preferably guided around this module.

**[0067]** Fig. 3 shows an example of a wing-stretching module. This module in this case comprises two rotating elements 11 which are positioned at a certain distance from one another. The carcass part 1 is guided between the rotating elements 11, with resilient elements 12 which are positioned on the rotating elements 11 stretching the wings or wing parts. These resilient elements 12 may, for example, be formed by rubber plucking fingers. Fig. 3b also shows the direction of rotation of the two rotating elements 11; in Fig. 3a, T denotes the conveying direction of the carcass part 1 as it follows the path.

**[0068]** A carcass part 1 which, in addition to at least part of the rib cage and which is naturally present thereon, also comprises a neck opening and a wing joint, preferably with at least a part of the wing still attached to the wing joint can be processed using a device and a first method not according to the invention.

**[0069]** The device that is suitable for use in the first method not according to the invention comprises a wing-joint positioning member 21, which is designed to be introduced into the carcass part 1. This wing-joint positioning member 21 is provided with one or more wing-joint positioning surfaces 22. In the exemplary embodiment shown in Fig. 4, there are two of these surfaces. In the exemplary embodiment of Fig. 4, the wing-joint positioning member 21 is provided with a cutting edge 21' for cutting the wishbone loose from the other parts of the carcass part.

**[0070]** The wing-joint positioning surfaces 22 are arranged in such a manner that in a defined position of the wing-joint positioning member 21 with respect to the carcass part 1 (for example the lowest position of the wing-joint positioning member 21 with respect to the carcass part 1) they each hold a wing joint at least substantially into a predetermined, reproducible position from the inside of the carcass part 1.

**[0071]** Furthermore, the device comprises pressure-exerting means 23 for pressing on the carcass part 1 from the outside. In this way, any wing joint which is present is reproducibly supported by the joint-positioning surface 22 of the wing-joint positioning member 21. As a result, the wing joints which are present are accurately held into the predetermined position in a particularly reliable way.

[0072] If the carcass part 1 also comprises at least part of the wishbone, which has to be cut loose from the carcass part it is advantageous if the wing-joint positioning member 21 is also designed to at least partially cut that part of the wishbone which is present loose from the carcass part 1. To this end, the wing-joint positioning member is preferably provided with a suitable cutting edge 21'. Further means may also be present for cutting the wishbone (or that part of the wishbone which is present) loose and removing it from the carcass part 1. In this context, consideration may be given, for example, to a combination of the first method not according to the invention with the second method not according to the invention. In that case, the wing-joint positioning member 21 is used as first wishbone blade, which first wishbone blade is described in relation to the second method not according to the invention.

[0073] Accurate positioning of the wing joints is important if it is desired for accurate processing operations to be carried out on the wing joints.

[0074] Such a situation arises if the carcass part 1 also comprises one or more inner fillets (also known as "second fillets"). In that case, it is desirable for just some of the connecting tendons between a wing part and the other parts of the carcass part 1 to be cut through, in such a manner that at least one connecting tendon between the outer fillet and a wing part remains intact. As a result, during the harvesting of the outer fillet the inner fillets remain behind on the bone parts of the body of the carcass part 1, and the inner fillets can then be harvested automatically or manually in a known way (preferably as described in EP 0 695 506). One advantage of manual harvesting is that final inspection of the carcass part 1 can then take place at the same time.

[0075] Another example of a processing operation on the wing joint which requires accurate positioning is the cutting through of the wing joint, in which case the wing-cutting blade which is used to make the incision moves substantially between the bone parts of each wing joint, and in which case after the cutting operation a connection remains between the wing part and an other part of the carcass part 1.

[0076] In the first method not according to the invention, these two accurate processing operations are preferably carried out using special sickle-shaped wing-cutting blades 24 which comprise a facet 25 which prevents the tendons which are to be cut through from slipping off the blade during the cutting operation. The blades also act as a wedge which pushes the bone parts of the wing joint apart. Fig. 5 shows the introduction of the wing-cutting blades 24.

[0077] To enable high production rates to be achieved, it is preferable for a number of devices suitable for use in the first method not according to the invention to be accommodated in a turret machine, as shown in Fig. 6. Fig. 7 shows an alternative arrangement.

[0078] In the case of processing of products having a neck or neck skin, the neck or neck skin may impede the introduction of the wing-joint positioning member 21. To prevent this, the device according to the invention is preferably provided with means which hold the neck or neck skin away from the neck opening, for example guides.

[0079] It is preferable for the device and method in accordance with the method not according to the invention to be combined with the device and method in accordance with the second method not according to the invention. In that case, the wing-joint positioning member 21 is provided with a suitable cutting edge, so that the wing-joint positioning member can be used as first wishbone blade.

[0080] The second method not according to the invention relates to the processing of a carcass part 1 of slaughtered poultry. The carcass parts which can be processed in accordance with the corresponding method and using a corresponding device comprise at least part of the ribs, part of the meat which is naturally present thereon, a neck opening and part of the wishbone. In the example described below, the entire wishbone is present.

[0081] In the second method not according to the invention too, the carcass part 1 which is to be processed is applied and fixed to a product carrier 2 of the type described above.

[0082] To enable the wishbone to be removed, a block is introduced into the carcass part 1 through the neck opening. The block has a recess for receiving the wishbone and is arranged between the two limbs of the wishbone.

[0083] Then, a first wishbone blade 21 is introduced into the carcass part 1 via the neck opening, in such a manner that it is positioned next to one side of the block in the carcass part 1.

[0084] The first wishbone blade 21 has a cutting edge, the contour of which substantially corresponds to the outer contour of the

complete wishbone, so that as it is introduced it cuts loose that side of the wishbone which faces the back side of the carcass part 1. In this example, the first wishbone blade 21 is substantially in the shape of an arrow.

[0085] Then, two second wishbone blades 31 are moved into the carcass part 1 along either side of the block, substantially perpendicular to the first wishbone blade 21. The second wishbone blades 31 substantially follow the outer contour of the wishbone and cut the wishbone off the carcass part 1. The wishbone which has been cut loose is then enclosed between the block, the first wishbone blade 21 and the second wishbone blades 31.

[0086] To remove the wishbone from the carcass part 1, the block, the first wishbone blade 21 and the second wishbone blades 31 are together pulled back out of the carcass part 1 while the wishbone remains enclosed between the block, the first wishbone blade 21 and the second wishbone blades 31. In this way, the wishbone is removed from the carcass part 1.

[0087] To combine the first and second methods not according to the invention, the first wishbone blade 21 is preferably provided with wing-joint positioning surfaces 22.

[0088] Figs. 8 and 9 show additional cutting surfaces 32 which are added to the first wishbone blade 21. The addition of these additional cutting surfaces 32 further widens the first wishbone blade 21 on the wide side of the arrowhead. This makes the first wishbone blade 21 significantly wider on the wide side than the wishbone at that location.

[0089] The local widening of the first wishbone blade 21 allows the meat to be cut loose from the underlying bone parts as far as the immediate vicinity of the wing surface. This ensures that the meat between the wishbone and the wing joint is harvested with the fillet.

[0090] When the wishbone has been removed from the carcass part 1, the first wishbone blade 21 and the second wishbone blades 31 are moved back to a greater distance from the block. In the first instance, the wishbone is then still on the block. It is preferable to use compressed air to remove the wishbone from the block. The device preferably comprises compressed-air means for removing the wishbone or that part of the wishbone which is present from the block.

[0091] In the case of processing products with a neck or neck skin, the neck or neck skin may impede the introduction of the block and/or the first wishbone blade 21. To prevent this, the device according to the invention is preferably provided with means which hold the neck or neck skin away from the opening, for example guides.

[0092] To enable high production rates to be achieved, it is preferable for a number of devices suitable for use in the second method not according to the invention to be accommodated in a turret machine, as shown in Figures 6 and 7.

[0093] The third method not according to the invention relates to processing of carcass parts which comprise at least part of the ribs and part of the meat which is naturally present thereon, on both the breast side and the back side.

[0094] In the third method not according to the invention too, the carcass part 1 which is to be processed is applied and fixed to a product carrier 2 of the type described above.

[0095] Back-cutting means 71 make two incisions in the meat on the back side of the carcass part 1. These incisions extend on either side of the backbone (or the location in the carcass part 1 where the backbone was located before being removed), and run substantially parallel thereto. This is shown in Figs. 10 and 11. In this example, the back-cutting means 71 are designed as rotating blades.

[0096] Scraper means 72 loosen the back and shoulder meat from the bone parts of the body of the carcass part 1, in such a manner that a connection between the back and shoulder meat, on the one hand, and the breast meat - which is still connected to the bone parts of the body of the carcass part 1 - on the other hand remains in existence. The scraper means 72 start scraping from the incisions which have already been made by the back-cutting means 71 on either side of the backbone. If a wing-joint incision has also been made, for example by the sickle-shaped wing-cutting blades 24, the scraping preferably begins from both the incisions which have been made by the back-cutting means 71 on either side of the backbone and from the wing-joint incisions.

[0097] The scraper means 72 are preferably mounted resiliently and are preferably actuated pneumatically after the wing joints have moved past.

[0098] The scraper means 72 shown in Fig. 11 and the guide plates 73 which follow them are formed in such a manner that they hold the meat which has been scraped off at a certain distance from the bone parts of the body of the carcass part 1. As a result, a space is formed between the said bone parts and the back and shoulder meat. In the example shown in Fig. 11, this space is used for an incision to be made beneath the shoulder blade by small resiliently mounted blades 74. As a result, the pellicle which is present can be harvested more easily with the meat.

[0099] Then, the breast meat is removed from the bone parts of the body of the carcass part 1, in such a manner that the breast meat, back meat and shoulder meat is still connected when it is removed in its entirety from the bone parts of the body of the carcass part 1, for example using the method and device in accordance with the invention.

[0100] According to the appended claims, the invention relates to processing of carcass parts which comprise at least part of the ribs, part of the meat which is naturally present thereon and part of at least one of the wings.

[0101] The carcass part 1 which is to be processed is applied and fixed to a product carrier 2 of the type described above.

[0102] The carcass part 1 is moved into a position in which its longitudinal axis is located substantially vertically and substantially perpendicular to the conveying direction of the product carrier 2, and the wings or wing parts 91 which are present are hanging downwards, substantially in the direction of the longitudinal axis of the carcass part 1, as shown in Fig. 12. In this position, the carcass part 1 is fed to a device in accordance with the invention.

[0103] As they enter the device, the hanging wings or wing parts 91 are introduced between horizontal wing guides 81 which extend substantially in the conveying direction of the product carrier 2.

[0104] The wings or wing parts 91 are then retained by projections 82, while the product carrier 2 conveys the bone parts of the body of the carcass part 1 onwards. The projections 82 at the same time make a preliminary incision at the start of the wing, in such a manner that the wings or wing parts 91 which are present remain connected to the meat which is present on the carcass part 1.

[0105] On account of the fact that the projections 82 are retaining the wings or wing parts 91 and the product carrier 2 is conveying the bone parts of the body of the carcass part 1 onwards in the conveying direction T, the distance between the wings or wing parts 91 which are present and the bone parts of the body of the carcass part 1 are increased. The product carrier 2 is also rotated, in such a manner that the said distance is increased further.

[0106] The increase in the said distance causes a force to be exerted on the wings or wing parts 91. As a result, the fillet 90, which comprises breast meat, back meat, shoulder meat and possibly eye meat, and the wings or wing parts 91 which are present are together pulled off the bone parts of the body of the carcass. The inner fillets ("second fillets") remain behind on the bone parts of the body of the carcass part 1, in a state which is such that they can easily be harvested by hand or automatically.

[0107] A driver 83 conveys the torn-off assembly comprising the fillet 90 and the wings or wing parts 91 which are present downwards towards separation means 84 which are arranged below the level at which the processing of the carcass parts in the device in accordance with the invention begins (denoted by X in Fig. 12).

[0108] The separation means 84 separate the wings or wing parts 91 which are present from the fillets 90, after which wings or wing parts 91 and fillets 90 are discharged from the device by a discharge belt 85.

[0109] The devices according to the invention or suitable for use in the first, second and/or third method not according to the invention are preferably arranged along the path along which the product carriers move. It is not necessary for all the devices described to be used in combination. It is also possible to provide a feature which allows one or more processing devices to be bypassed.

[0110] It is possible for the devices described to be designed as stand-alone machines, i.e. not combined with an overhead conveyor or other type of conveyor which guides the carcass parts past various processing devices.

[0111] It is not necessary for the product carrier to be able to pivot in a plurality of planes with respect to the path for all the processing operations described. It is sometimes sufficient for the product carrier to be able to pivot in one plane, or it may even be possible to use a rigid product carrier.

[0112] There is provision for a processing device which divides the carcass parts through the middle in the longitudinal direction

(i.e. substantially in the direction of the backbone and/or breastbone) to be incorporated along the path covered by the carcass parts. It is also possible for the processing devices as described above to carry out the processing operations on halved carcass parts which have been created in this way. It is also possible for the processing devices to be completely designed to process halved carcass parts of this type and therefore to carry out the processing operations on only one side of the product carrier.

[0113] There is provision for a processing device which removes any residues of the neck skin and/or the crop fat to be incorporated along the path covered by the carcass parts. A device of this type is shown in Fig. 14.

[0114] There is provision for a processing device which cuts off parts of the carcass part 1 (such as for example back pieces intended for soup packets) to be incorporated along the path covered by the carcass parts. The shape of the product carrier 2 is preferably adjusted accordingly, so that the blades which cut off the part of the carcass part 1 cannot cause any damage to the product carrier 2. A device of this type is shown in Fig. 18.

[0115] There is provision for a processing device which harvests the second fillets which have remained on the bone parts of the body of the carcass part 1 after it has moved past the device in accordance with the invention to be incorporated along the path covered by the carcass part. This is preferably carried out in the manner described in EP 0 695 506 and shown in Figures 15, 16 and 17. This method involves cutting loose the second fillets and the associated pellicle, slitting them along the breastbone and peeling off the second fillets (cf. Fig. 15, steps I, II and III, respectively). The second fillets can then be harvested by hand (cf. Fig. 16) or automatically (cf. Fig. 17). Manual harvesting has the advantage that during harvesting a final inspection for any meat remaining on the carcass part 1 can take place.

[0116] It is preferable for the product carrier 2 to be advanced along its path by a chain conveyor, with the product carrier 2 always located beneath the chain conveyor.

[0117] It is preferable for the product carrier 2 to be pivoted into the optimum orientation with respect to the device which is used to carry out each individual processing step.

[0118] A second method not according to the invention pertains to processing a carcass part of slaughtered poultry, which carcass part comprises at least part of a rib cage, meat which is naturally present on said rib cage, a neck opening and part of the wishbone, which method comprises the following steps:

- applying and fixing the carcass part to a product carrier, which product carrier is moveable along a path and which product carrier engages on the inside of the carcass part.
- moving a block into the carcass part through the neck opening of the carcass part, which block has a recess for receiving the wishbone or that part of it which is present, and which block is arranged between the two limbs of the wishbone or between the locations at which these limbs would be located if the entire wishbone were present.
- cutting the wishbone or that part of it which is present loose from the carcass part on the side facing the back side of the carcass part by introducing a first wishbone blade along one side of the block, the first wishbone blade having a cutting edge, the contour of which substantially corresponds to the outer contour of the complete wishbone.
- introducing two second wishbone blades into the carcass part on either side along the block, preferably substantially perpendicular to the first wishbone blade, the second wishbone blades substantially following the outer contour of the complete wishbone, and cutting the wishbone or that part of it which is present loose from the carcass part, in such a manner that the wishbone or that part of it which is present is enclosed between the block, the first wishbone blade and the second wishbone blades.
- pulling the block, the first wishbone blade and the second wishbone blades back out of the carcass path together, in such a manner that the wishbone or that part of it which is present remains enclosed between the block, the first wishbone blade and the second wishbone blades and is thereby removed from the carcass part.

[0119] Preferably, the second method not according to the invention is further characterized in that a first wishbone blade which is provided with wing-joint positioning surfaces in accordance with the first method not according to the invention is used.

[0120] Preferably, the second method not according to the invention is further characterized in that a first wishbone blade which at least in part is wider than the outer contour of the complete wishbone is used.

[0121] Preferably, the second method not according to the invention is further characterized in that a first wishbone blade which is designed to cut all the way to the immediate vicinity of the wing surface is used.

[0122] Preferably, the second method not according to the invention is further characterized in that after the wishbone or that part of it which is present has been removed from the carcass part, compressed air is used to remove the wishbone or that part of it which is present from the block.

[0123] Preferably, the second method not according to the invention is further characterized in that the neck opening is cleared before the first wishbone blade is introduced, or more generally, that the neck opening is cleared before performing an operation on the wishbone or a part thereof which is present. Under "clearing of the neck opening" a removal of skin and/or crop fat and/or other tissue is to be understood.

[0124] The second method not according to the invention can be carried out in a device for processing a carcass part of slaughtered poultry, which carcass part comprises at least part of a rib cage, meat which is naturally present on said rib cage, a neck opening and part of the wishbone, the carcass part having an interior, which device comprises:

- a product carrier for supporting and retaining the carcass part, which product carrier is designed to move along a path and is preferably pivotable in a plurality of planes with respect to this path, which product carrier is adapted to engage the interior of the carcass part,
- a block which is designed to be moved through the neck opening into the carcass part until it is located between the two limbs of the wishbone or between the locations at which these limbs would be located if the entire wishbone were present, which block has a recess for receiving the wishbone or that part of the wishbone which is present.

characterized in that the device also comprises:

- a first wishbone blade, which has a cutting edge whose contour substantially corresponds to the outer contour of the complete wishbone for cutting the wishbone or that part of the wishbone which is present loose from the carcass part on the side facing the back side of the carcass part, which first wishbone blade is designed to be introduced into the carcass part along one side of the block,
- at least two second wishbone blades, which are designed to be introduced into the carcass part along either side of the block, preferably substantially perpendicular to the first wishbone blade, the second wishbone blades substantially following the outer contour of the complete wishbone, and being designed to cut the wishbone or that part of the wishbone which is present loose from the carcass part, in such a manner that the wishbone or that part of the wishbone which is present is enclosed between the block, the first wishbone blade and the second wishbone blades,

and characterized in that the device is designed to pull the block, the first wishbone blade and the second wishbone blades out of the carcass part together, in such a manner that the wishbone or that part of the wishbone which is present remains enclosed between the block, the first wishbone blade and the second wishbone blades, so that the wishbone or that part of the wishbone that is present is removed from the carcass part together with the block, the first wishbone blade and the second wishbone blades.

[0125] Preferably, the device suitable for use in the second method not according to the invention is further characterized in that the first wishbone blade comprises wing-joint positioning surfaces in accordance with the first method not according to the invention.

[0126] Preferably, the device suitable for use in the second method not according to the invention is further characterized in that the first wishbone blade is at least in part wider than the outer contour of the complete wishbone.

[0127] Preferably, the device suitable for use in the second method not according to the invention is further characterized in that the first wishbone blade is designed to cut as far as the immediate vicinity of the wing surface.

[0128] Preferably, the device suitable for use in the second method not according to the invention is further characterized in that the device comprises compressed-air means for removing the wishbone or that part of the wishbone which is present from the block.

[0129] Preferably, the device suitable for use in the second method not according to the invention is further characterized in that the device comprises means for clearing the neck opening before the first wishbone blade is introduced, or more generally, means for clearing the neck opening before performing an operation on the wishbone or a part thereof which is present. Under "clearing of the neck opening" a removal of skin and/or crop fat and/or other tissue is to be understood.

[0130] Preferably, the device suitable for use in the second method not according to the invention is further characterized in that

the device is accommodated in a turret machine.

[0131] In the second method not according to the invention, it is possible to use a block which is suitable for use in a device suitable for use in the second method not according to the invention.

[0132] A third method not according to the invention pertains to processing a carcass part of slaughtered poultry, which carcass part comprises at least part of a rib cage, meat which is naturally present on said rib cage on both the breast side and the back side, the carcass part having an interior which method comprises the following steps:

- applying and fixing the carcass part to a product carrier, which product carrier is moveable along a path and is preferably pivotable in a plurality of planes with respect to this path, and which product carrier engages the interior of the carcass part,
- making two incisions in the meat on the back side of the carcass part, which incisions extend on either side of the backbone or the location in the carcass part where the backbone was located before being removed, and run substantially parallel thereto,
- loosening the back and shoulder meat from the bone parts of the body of the carcass part, in such a manner that a connection between the back and shoulder meat, on the one hand, and the breast meat - which is still connected to the bone parts of the body of the carcass part - on the other hand continues to exist, the back and shoulder meat being removed by the use of scraper means which initiate scraping from the incisions which have already been made on either side of the backbone,
- removing the breast meat from the bone parts of the body of the carcass part, in such a manner the breast, back and shoulder meat is all still joined together when it is removed in its entirety from the bone parts of the body of the carcass part.

[0133] Preferably, the third method not according to the invention is further characterized in that the scraper means are arranged resiliently

[0134] Preferably, the third method not according to the invention is further characterized in that the incisions along the backbone are made using rotating blades.

[0135] Preferably, the third method not according to the invention is further characterized in that after the back and shoulder meat has been removed from the bone parts of the body of the carcass part, an incision is made beneath the shoulder blade, so that substantially all the meat located on the ribs is harvested.

[0136] The third method not according to the invention can be carried out in a device for processing a carcass part of slaughtered poultry, which carcass part comprises at least part of a rib cage, meat which is naturally present on said rib cage on both the breast side and the back side, the carcass part having an interior which device comprises:

- a product carrier for supporting and retaining the carcass part, which product carrier is designed to move along a path and is preferably pivotable in a plurality of planes with respect to this path,
- and which product carrier is adapted to engage the interior of the carcass part, and the product carrier being designed to position the carcass part,
- cutting means for making two incisions in the meat on the back side of the carcass part, these incisions extending on either side of the backbone or the location in the carcass part where the backbone was located before it was removed, and run substantially parallel thereto,
- scraper means for removing the back and shoulder meat from the bone parts of the body of the carcass part, which initiate the scraping-off of the back and shoulder meat from the incisions which have already been made on either side of the backbone,
- means for removing the breast meat from the bone parts of the body of the carcass part,

characterized in that the scraper means are designed in such a manner that during the removal of the back and shoulder meat from the bone parts of the body of the carcass part a connection remains between the back and shoulder meat, on the one hand, and the breast meat - which is still connected to the bone parts of the body of the carcass part - on the other hand, and in that the means for removing the breast meat from the bone parts of the body of the carcass part are designed in such a manner that the breast, back and shoulder meat is still connected when it is removed in its entirety from the bone parts of the body of the carcass part.

[0137] Preferably, the device suitable for use in the third method not according to the invention is further characterized in that the scraper means are arranged resiliently

[0138] Preferably, the device suitable for use in the third method not according to the invention is further characterized in that the cutting means are rotating blades.

[0139] Preferably, the device suitable for use in the third method not according to the invention is further characterized in that after the back and shoulder meat has been removed from the bone parts of the body of the carcass part, an incision is made beneath the shoulder blade, so that substantially all the meat on the ribs is harvested.

[0140] Any previously described method is preferably further characterized in that the product carrier is pivoted into the optimum orientation for each processing step with respect to the device with which the processing step is carried out.

## REFERENCES CITED IN THE DESCRIPTION

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## Patentkrav

1. Fremgangsmåde til bearbejdning af en slagtekropdel (1) af slagtet fjerkræ, hvor slagtekropdelen (1) omfatter mindst en del af en brystkasse, en del af kødet, som er naturligt forekommende på brystkassen, en del af mindst én af vingerne, hvor slagtekropdelen (1) har et indre, hvilken fremgangsmåde omfatter de følgende trin:
- anbringe og fastgøre slagtekropdelen (1) til en produktbærer (2), hvilken produktbærer (2) kan bevæges langs en bane og fortrinsvis er drejelig i en flerhed af planer i forhold til produktbærerens (2) bane, hvilken produktbærer (2) er indrettet til at gå i indgreb med det indre af slagtekropdelen (1),
  - positionere slagtekropdelen (1) på en sådan måde at den langsgående akse af slagtekropdelen (1) er anbragt i det væsentlige vertikalt og i det væsentlige vinkelret på produktbærerens (2) transportretning, og vingerne eller vingedelene (91), der er til stede, hænger nedad, i det væsentlige i retning af slagtekropdelens (1) langsgående akse,
  - indføre de hængende vinger eller vingedele (91) mellem horisontale føringer (81), der strækker sig i det væsentlige i produktbærerens (2) transportretning,
  - fastholde vingerne eller vingedelene (91), der er til stede, mens produktbæreren (2) transporterer knogledelene af kroppen af slagtekropdelen (1) videre, hvor der laves et første snit samtidig ved vingernes begyndelse på en sådan måde, at vingerne eller vingedelene (91), der er til stede, forbliver forbundet med brystkødet, der findes på slagtekropdelen (1),
  - forøge afstanden mellem vingerne eller vingedelene (91), der er til stede, og knogledelene af kroppen af slagtekropdelen (1) ved at udøve en kraft på vingerne eller vingedelene (91), der er til stede, på en sådan måde, at fileten og vingerne eller vingedelene (91), der er til stede, sammen trækkes af knogledelene af kroppen af slagtekropdelen,
  - transportere sættet, der omfatter fileten og vingerne eller vingedelene (91), som er til stede, i nedadgående retning,
  - at separere fileterne og vingerne eller vingedelene (91), der er til stede, på et sted under det niveau, hvor bearbejdningen af produkterne begynder,
  - udlede fileter og vinger på et sted under det niveau, hvor bearbejdningen af produkterne begynder.

- 5  
2. Fremgangsmåde ifølge krav 1,  
hvor de udledte fileter og vinger modtages af en båndtransportør, der er anbragt under det niveau, hvor fileterne og vingerne udledes.
- 10  
3. Fremgangsmåde ifølge et hvilket som helst af de foregående krav,  
hvor rotation af produktbæreren (2) forårsager eller i det mindste bidrager til at forøge afstanden mellem vingerne eller vingedelene (91), der er til stede, og knogledelene af kroppen af slagtekropdelen (1).
- 15  
4. Fremgangsmåde ifølge et hvilket som helst af de foregående krav,  
hvor bevægelse af en produktbærer (2) langs banen forårsager eller i det mindste bidrager til at forøge afstanden mellem vingerne eller vingedelene (91), der er til stede, og knogledelene af kroppen af slagtekropdelen (1).
- 20  
5. Fremgangsmåde ifølge et hvilket som helst af de foregående krav,  
hvor fremgangsmåden endvidere omfatter at høste inderfileterne, hvor inderfileterne fortrinsvis fjernes fra knogledelene af slagtekropdelen (1) af brystkødet og vingerne eller vingedelene (91) er fjernet fra knogledelene.
- 25  
6. Fremgangsmåde ifølge et hvilket som helst af de foregående krav,  
hvor eventuelle rester af halsskindet og/eller halsfedtet fjernes, og/eller hvor vingedelene, der er til stede, strækkes, efter slagtekropdelen (1) er blevet anbragt og fastgjort på produktbæreren (2).
- 30  
7. Fremgangsmåde ifølge et hvilket som helst af de foregående krav,  
hvor produktbæreren (2) føres frem langs banen af en kædetransportør, hvor produktbæreren (2) altid befinder sig under kædetransportøren.
- 35  
8. Indretning til bearbejdning af en slagtekropdel (1) af slagtet fjerkræ, hvor slagtekropdelen (1) omfatter mindst en del af en brystkasse, en del af kødet, som er naturligt forekommende på brystkassen og en del af mindst én af vingerne, hvor slagtekropdelen (1) har et indre, hvilken indretning omfatter:  
- en produktbærer (2) til at bære og fastholde slagtekropdelen (1), hvilken produktbærer (2) er udformet til at bevæge sig langs en bane og fortrinsvis

kan drejes i en flerhed af planer, og hvilken produktbærer (2) er indrettet til at gå i indgreb med det indre af slagtekropdelen (1),

- i det væsentlige horisontale føringer (81), der strækker sig i det væsentlige i produktbærernes (2) transportretning med henblik på at føre vingerne eller vingedelene (91), der er til stede,

- et fastholdelsesmiddel (82) til fastholdelse af vingerne eller vingedelene (91), der er til stede, mens produktbæreren (2) transporterer knogledelene af kroppen af slagtekropdelen (1) videre,

- første skæremidler, der samtidig med, at vingerne eller vingedelene (91) fastholdes, laver et første snit ved vingernes begyndelse på en sådan måde, at vingerne eller vingedelene (91), der er til stede, forbliver forbundet med brystkødet, der er til stede på slagtekropdelen (1),

- en drivindretning (83) til at forøge afstanden mellem vingerne eller vingedelene (91), der er til stede, og knogledelene af kroppen af slagtekropdelen (1) ved at udøve en kraft på vingerne eller vingedelene (91), der er til stede, på en sådan måde, at fileten og vingerne eller vingedelene (91), der er til stede, sammen trækkes af knogledelene af kroppen af slagtekropdelen, og til at transportere enheden, der omfatter fileten og vingerne eller vingedelene (91), som er til stede,

- separeringsmidler (84) til at separere fileterne og vingerne eller vingedelene (91), der er til stede, fra hinanden,

- udledningmidler til at udlede fileterne og vingerne eller vingedelene (91) fra indretningen,

**kendetegnet ved, at**

produktbæreren (2), under indføringen, er indrettet til at positionere slagtekropdelen (1) på en sådan måde, at slagtekropdelens (1) langsgående akse er anbragt i det væsentlige vertikalt og i det væsentlige vinkelret på produktbæreren (2) transportretning, og vingerne eller vingedelene (91), der er til stede, hænger nedad, i det væsentlige i retning af slagtekropdelens (1) langsgående akse,

og ved at både separeringsmidlerne (84) og udledningmidlerne er anbragt på et lavere niveau end det niveau, hvor produktbæreren (2) er anbragt, når den bevæger sig ind.

**9.** System til bearbejdning af en slagtekropdel (1) af slagtet fjerkræ, hvor slagtekropdelen (1) omfatter mindst en del af en brystkasse, en del af kødet,

som er naturligt forekommende på brystkassen og en del af mindst én af vingerne, hvor slagtekropdelen (1) har et indre, hvilket system omfatter:

- 5 - indretning ifølge krav 8,  
- en hængetransportør til at transportere produktbærerne (2) banen.

**10.** System ifølge krav 9, hvilket system endvidere omfatter en indretning til at høste inderfileter fra slagtekropdele (1), der skal bearbejdes, og/eller en indretning til fjernelse af ønskebenet fra slagtekropdele (1), der skal bearbejdes, og/eller en vinges-trækningsindretning, og/eller en indretning til fjernelse af halsskindrester og/eller en indretning til fjernelse af halsfedt.

**11.** System ifølge et hvilket som helst af kravene 9-10, hvor hængetransportøren omfatter en kædetransportør, der omfatter en kæde, hvilken kæde er anbragt over produktbæreren (2).

**12.** System ifølge et hvilket som helst af kravene 9-11, hvor systemet endvidere omfatter en båndtransportør, der er anbragt under udledningmidlerne af indretningen ifølge krav 8.

DRAWINGS

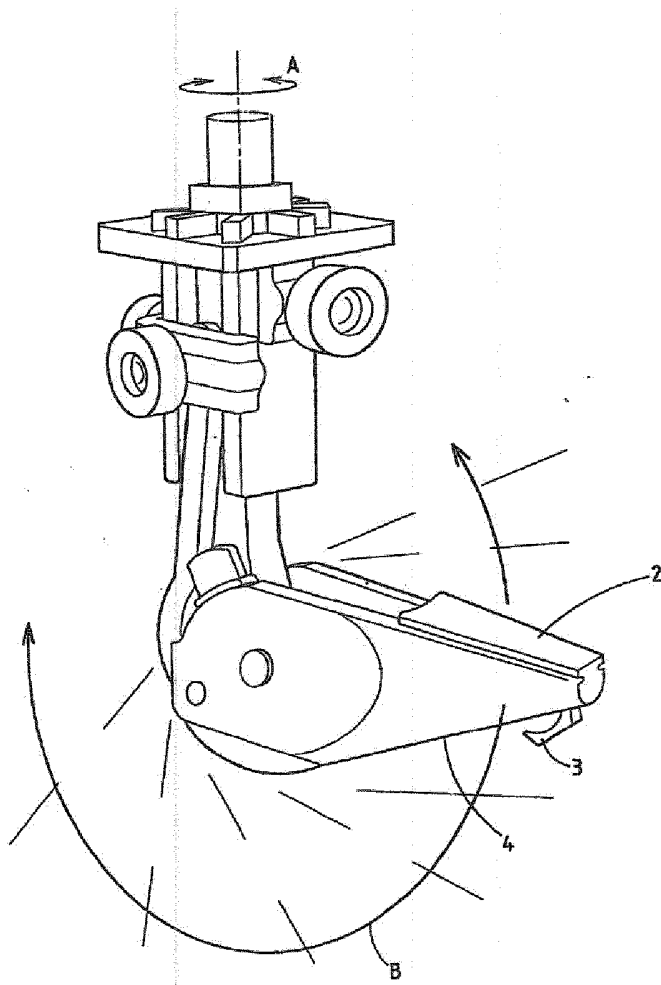
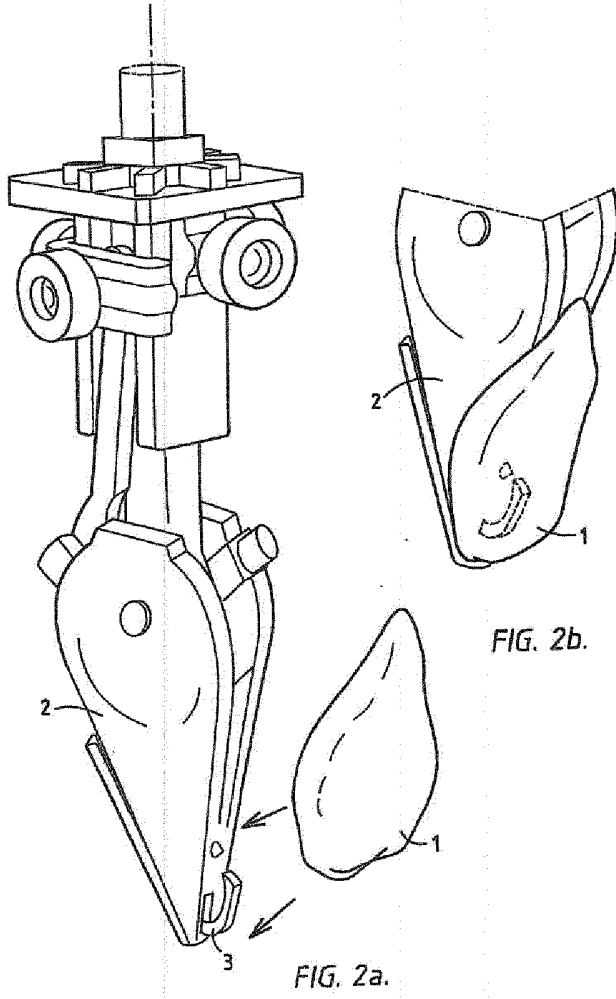


FIG. 1.



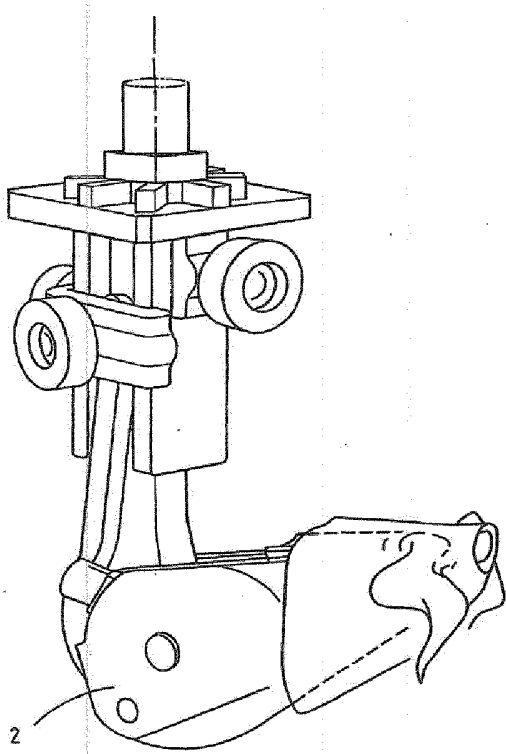
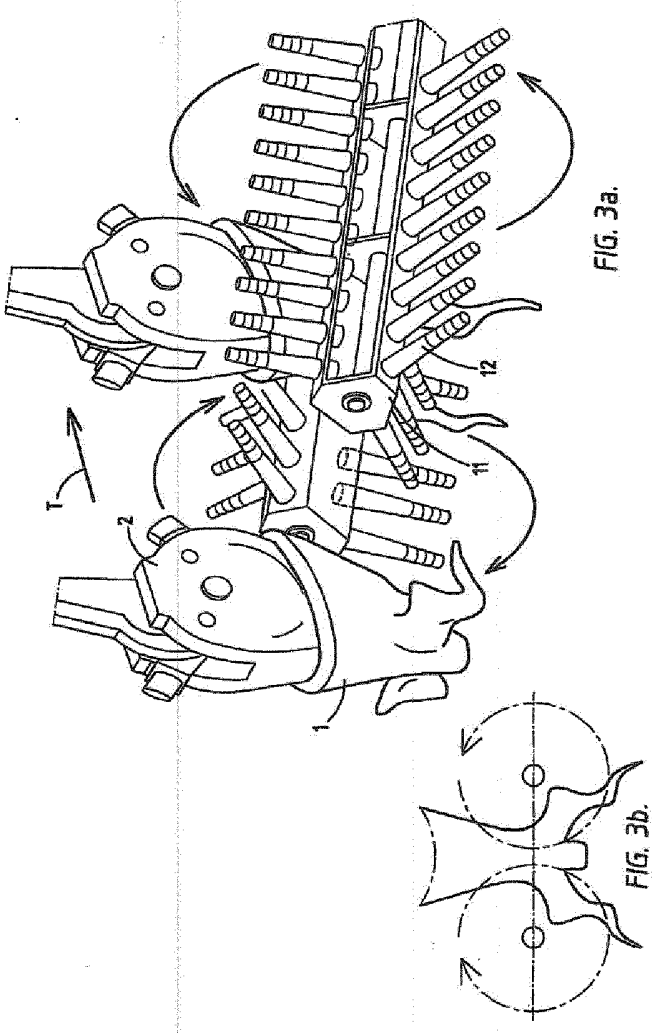


FIG. 2c



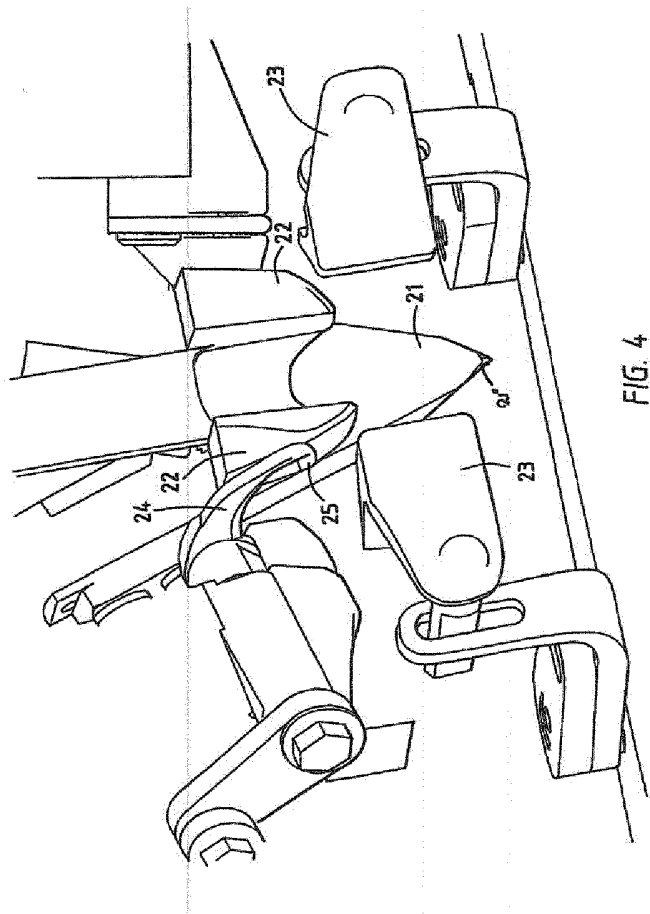


FIG. 4

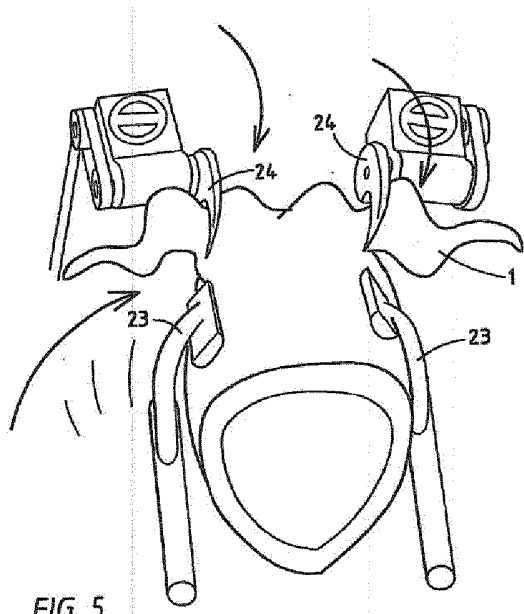
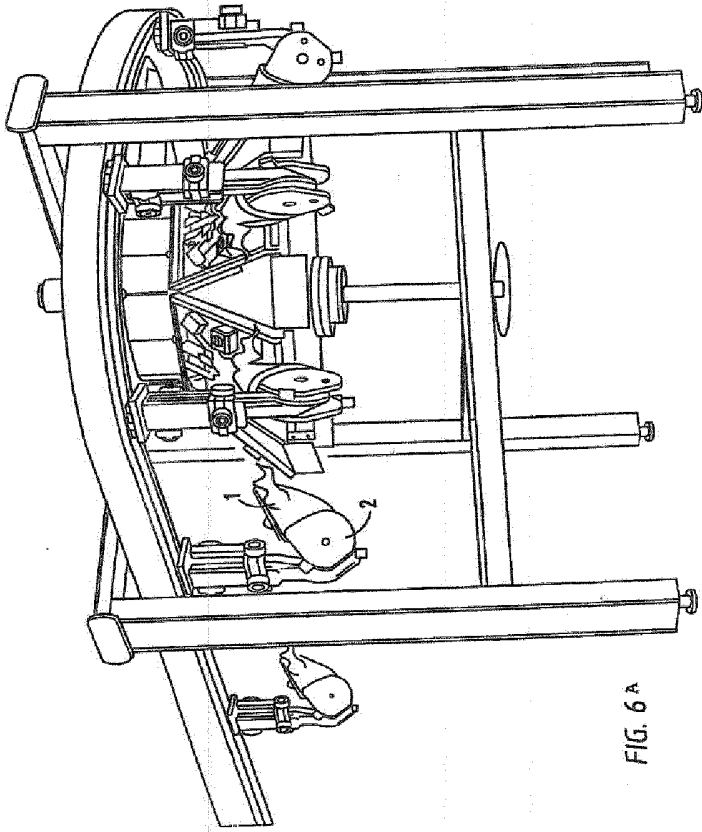


FIG. 5



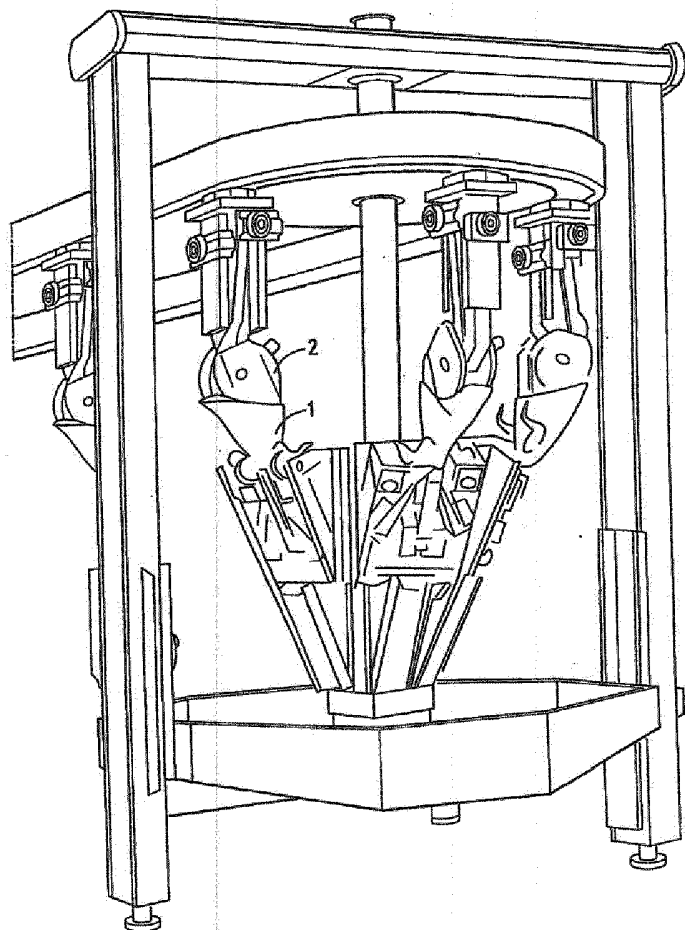


FIG. 6B

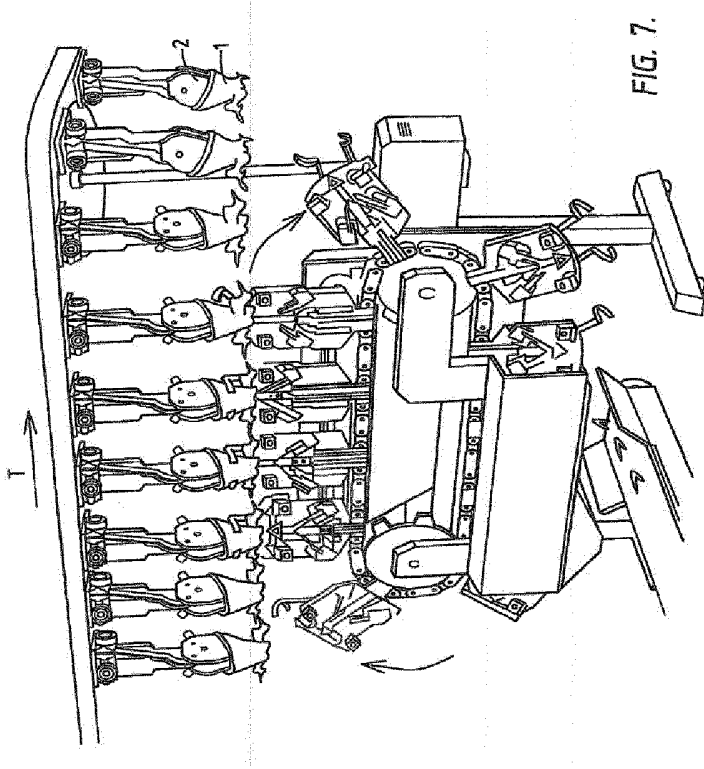


FIG. 7.

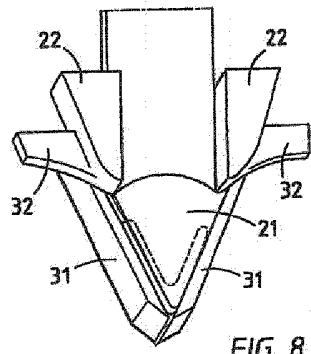


FIG. 8

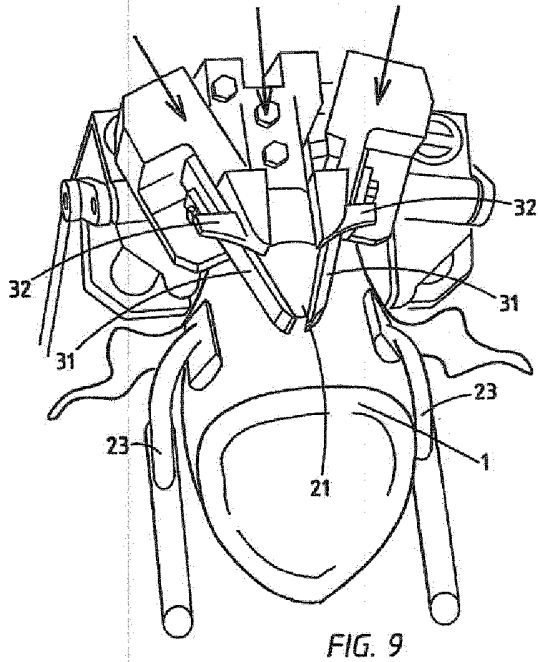
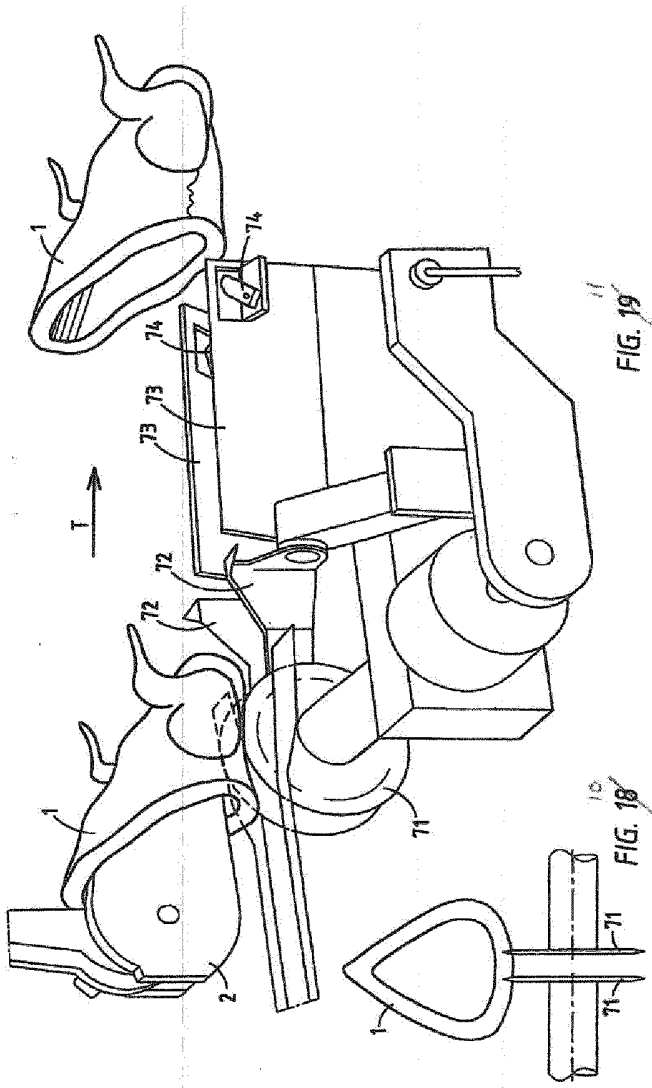


FIG. 9



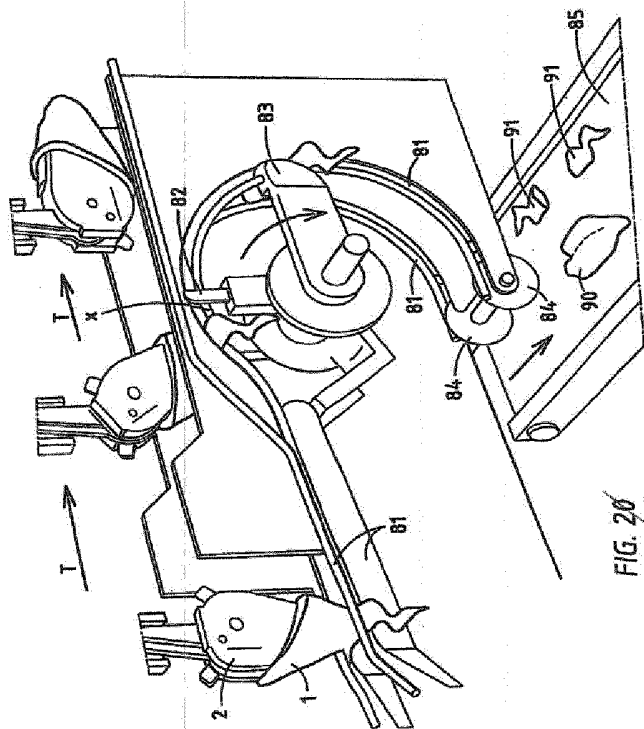
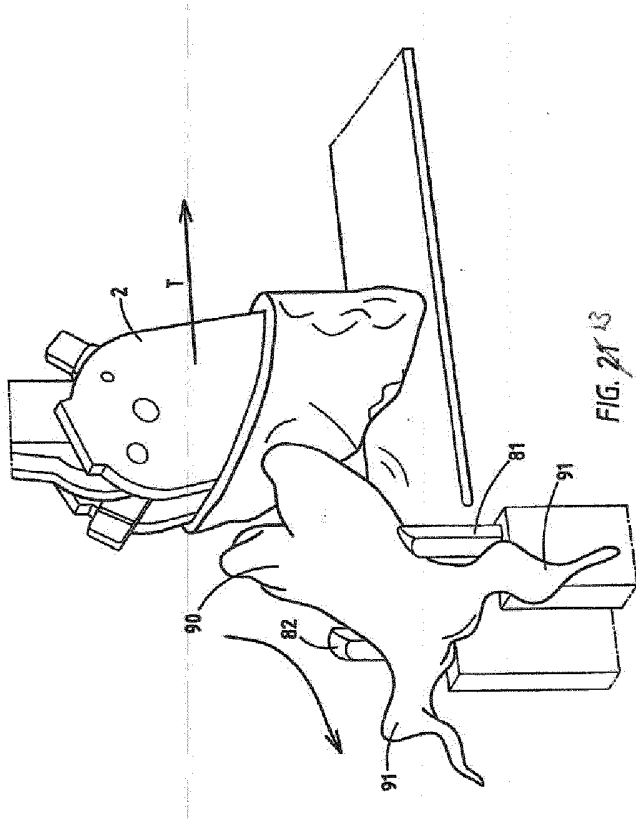


FIG. 20  
1/2



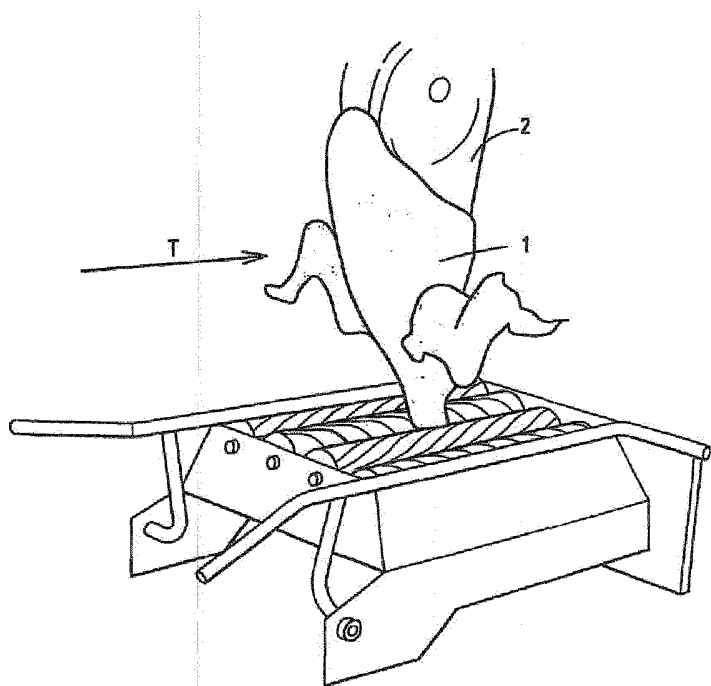
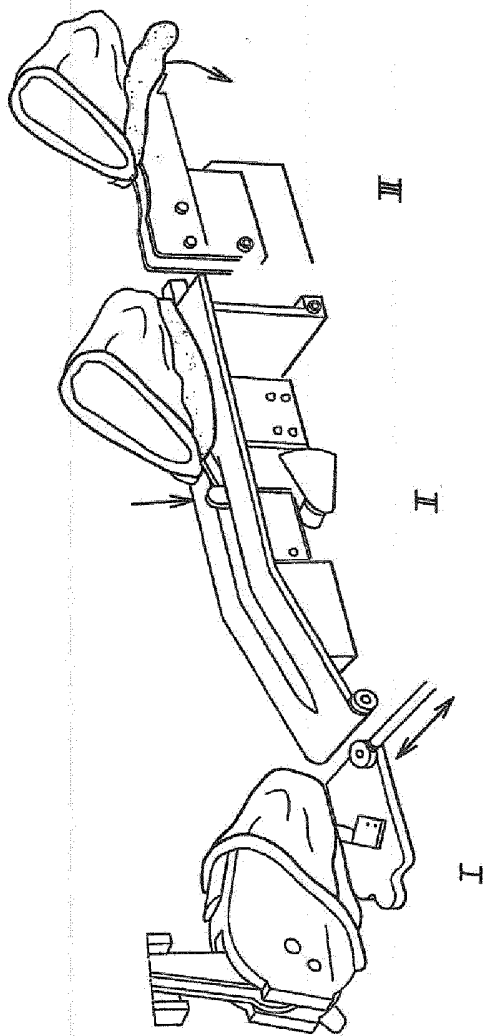
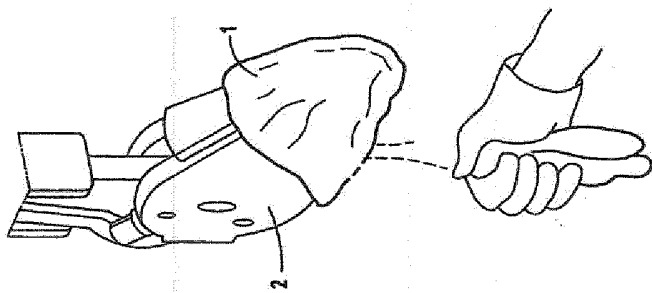


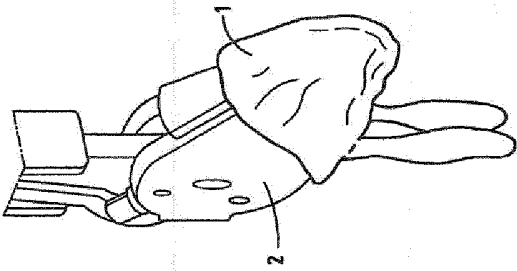
FIG. 22 ~~14~~



15  
FIG. 23



16  
FIG. 24



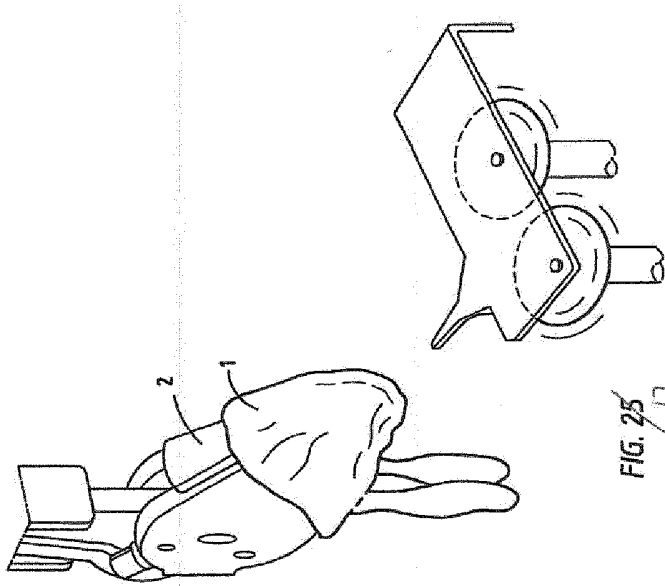


FIG. 25  
/17

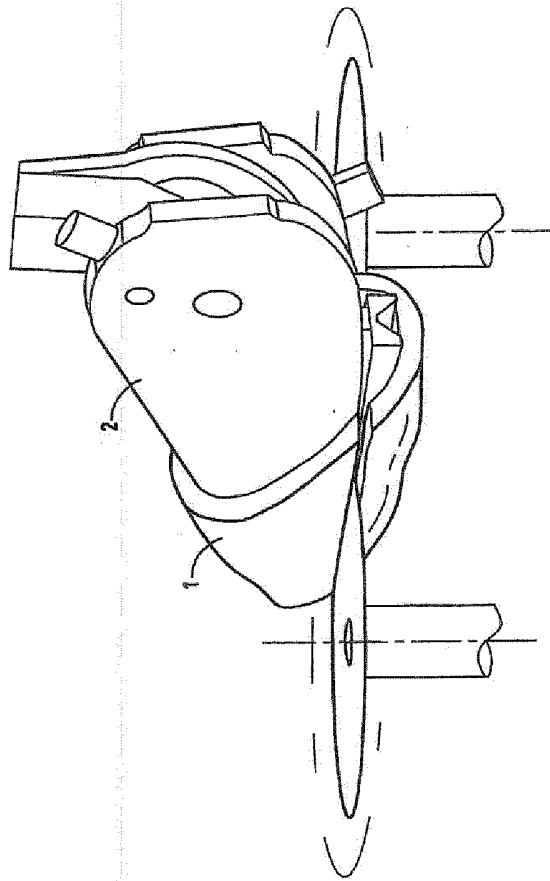


FIG. 26 10