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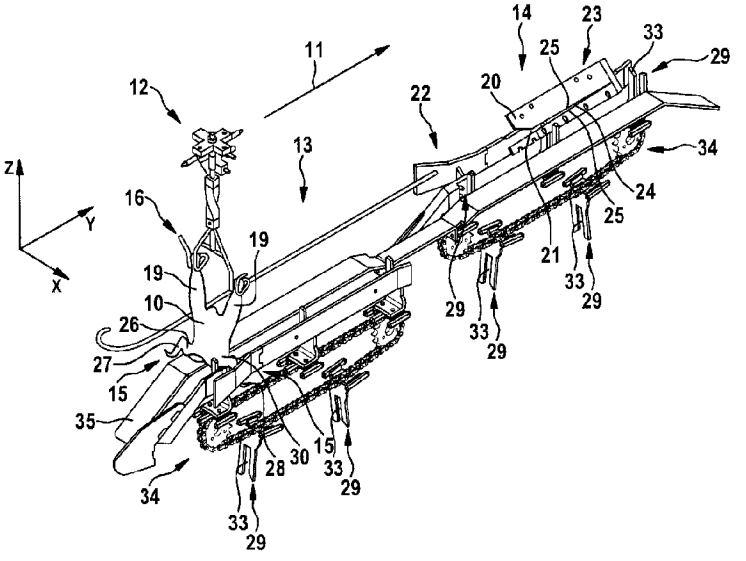
(54) **Titre : DISPOSITIF DE DECOUPE D'AILES ET PROCEDE DE SEPARATION DES AILES OU DE PARTIES DES AILES**
(54) **Title: WING-CUTTING APPARATUS AND METHOD FOR SEVERING WINGS OR WING PARTS**



(57) **Abrégé/Abstract:**
The present invention relates to a wing-cutting apparatus for processing poultry carcasses (10), comprising a conveying device (12), which is intended for conveying the poultry carcasses (10) in the transporting direction (11) along a conveying route, and also comprising a first severing device (13) and a second severing device (14), which are designed for severing wings or wing parts (15) in pairs from in each case one of the poultry carcasses (10), and the wing-cutting apparatus is distinguished in that the first severing device (13) and the second severing device (14) are offset in the transporting direction (11) along the conveying route such that the operations of severing the wings or the wing parts (15) in pairs take place one after the other in each case. The present invention also relates to a corresponding method.

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(54) Title: WING-CUTTING APPARATUS AND METHOD FOR SEVERING WINGS OR WING PARTS

(54) Bezeichnung : FLÜGELSCHNEIDVORRICHTUNG UND VERFAHREN ZUM ABTRENNEN VON FLÜGELN ODER FLÜGELTEILEN

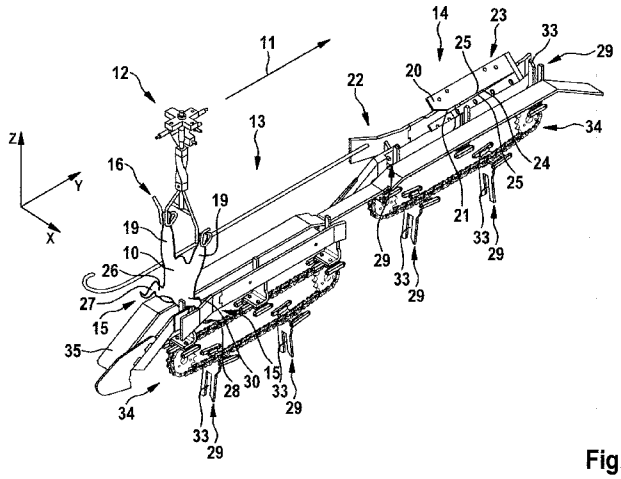

Fig. 1

(57) Abstract: The present invention relates to a wing-cutting apparatus for processing poultry carcasses (10), comprising a conveying device (12), which is intended for conveying the poultry carcasses (10) in the transporting direction (11) along a conveying route, and also comprising a first severing device (13) and a second severing device (14), which are designed for severing wings or wing parts (15) in pairs from in each case one of the poultry carcasses (10), and the wing-cutting apparatus is distinguished in that the first severing device (13) and the second severing device (14) are offset in the transporting direction (11) along the conveying route such that the operations of severing the wings or the wing parts (15) in pairs take place one after the other in each case. The present invention also relates to a corresponding method.

(57) Zusammenfassung:

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Erklärungen gemäß Regel 4.17:

— *hinsichtlich der Berechtigung des Anmelders, ein Patent zu beantragen und zu erhalten (Regel 4.17 Ziffer ii)*

— *Erfindererklärung (Regel 4.17 Ziffer iv)*

Veröffentlicht:

— *mit internationalem Recherchenbericht (Artikel 21 Absatz 3)*

Die vorliegende Erfindung betrifft eine Flügelschneidvorrichtung zur Verarbeitung von Geflügelschlachtkörpern (10), umfassend eine zum Fördern der Geflügelschlachtkörper (10) entlang einer Förderstrecke in Transportrichtung (11) eingerichtete Fördereinrichtung (12), eine erste Trenneinrichtung (13) und eine zweite Trenneinrichtung (14), die zum paarigen Abtrennen von Flügeln oder Flügelteilen (15) von jeweils einem der Geflügelschlachtkörper (10) ausgebildet sind und zeichnet sich dadurch aus, dass die erste Trenneinrichtung (13) und die zweite Trenneinrichtung (14) entlang der Förderstrecke in Transportrichtung (11) derart versetzt angeordnet sind, dass das paarige Abtrennen der Flügel oder der Flügelteile (15) jeweils nacheinander erfolgt. Des Weiteren betrifft die vorliegende Erfindung ein entsprechendes Verfahren.

Wing-cutting apparatus and method for severing wings or wing parts

The present invention relates to a wing cutting apparatus for processing poultry carcasses, comprising a conveying device configured to convey the poultry carcasses along a conveying line in a transport direction, and a first separating device and a second separating device which are designed to separate wings or wing parts in pairs from one each of the poultry carcasses.

The invention relates further to a method for separating wings or wing parts from poultry carcasses, comprising the steps of conveying the poultry carcasses along a conveying line in transport direction by means of a conveying device and separating the wings or wing parts in pairs from one of the poultry carcasses.

Such a wing cutting apparatus is known, for example, from document WO 92/07470 A1. The wings or wing parts are brought into a cutting position by means of wing holders and cut on both sides simultaneously by means of rotating blades.

A disadvantage is, on the one hand, that the outlay in terms of apparatus for holding and positioning the wings or wing parts to be separated is high. On the other hand, the positions of blades and wing holders are in each case fixed, so that different poultry body anatomies are not taken into account when separating the wings or wing parts. This leads to imprecise and unreliable cutting.

According to one aspect of the present invention, an object is to provide a wing cutting apparatus for processing poultry carcasses, comprising

a conveying device configured to convey the poultry carcasses along a conveying line in transport direction,

a first separating device and a second separating device which are designed to separate wings or wing parts in pairs from one each of the poultry carcasses,

wherein

the first separating device and the second separating device are arranged offset along the conveying line in the transport direction in such a manner that the wings or wing parts of a pair are each separated in succession, and wherein the conveying device comprises carrier elements for conveying and holding the poultry carcasses, characterised in that the carrier elements are so configured that the poultry carcasses are mounted to be deflectable at least substantially transversely to the transport direction.

According to another aspect of the present invention, an object is to provide a method for separating wings or wing parts from poultry carcasses, comprising the steps

- conveying the poultry carcass along a conveying line in transport direction by means of a conveying device,
- separating the wings or wing parts in pairs from one of the poultry carcasses,
- separation in pairs of the wings or wing parts is each performed in succession by means of a first separating device and a second separating device,

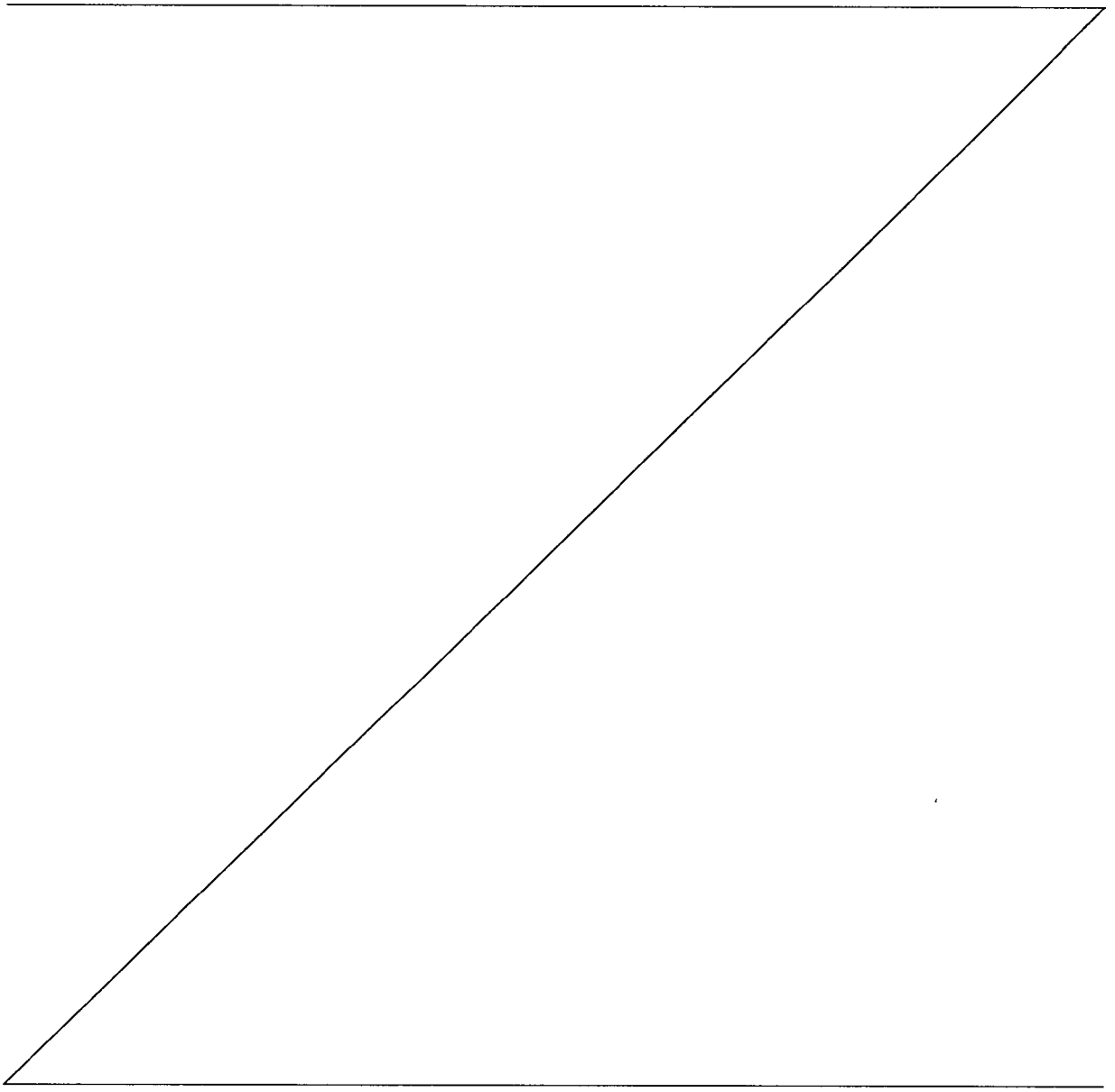
characterised in that the poultry carcasses are held and conveyed by means of carrier elements in such a manner that the poultry carcasses are each mounted to be deflectable at least transversely to the transport direction.

Other possible aspect(s), object(s), embodiment(s), variant(s) and/or advantage(s) of the present invention, all being preferred and/or optional, are briefly summarized hereinbelow.

For example, an object of the present invention could be to propose a wing cutting apparatus of the type mentioned hereinbefore which, with minimal structural complexity, allows the wings or wing parts to be separated precisely. A further object could be to propose a corresponding method.

This latter object can be achieved by an arrangement having the features mentioned hereinbefore in that the first separating device and the second separating device are arranged offset along the conveying line in the transport direction, in such a manner that the wings or wing parts of a pair are each separated in succession. In other words, the first

separating device and the second separating device are arranged spaced apart from one another in the transport direction.



The distance between the first and second separating devices is preferably so chosen that separation of one of the wings or wing parts by means of the first separating device is already complete before the second separating device comes into engagement with the wing or wing parts still remaining on the poultry carcass for separation thereof. In other words, the wing cutting apparatus according to the invention is designed and configured for the sequential separation of the pairs of wings or wing parts. This offers the advantage that the poultry carcasses are in each case in engagement on only one side with one of the separating devices during the separating operation. The poultry carcass is consequently not fixed on both sides during separation but is movable to a certain extent. Precise cutting is thus ensured, regardless of the size of the poultry carcasses.

An expedient embodiment of the invention is characterised in that the conveying device comprises carrier elements for conveying and holding the poultry carcasses, the carrier elements being so configured that the poultry carcasses are mounted to be deflectable at least substantially transversely to the transport direction. This offers the advantage that the poultry carcasses are able to deflect transversely to the transport direction to a certain extent in the transverse direction – depending on the size of the poultry carcass. This represents an important advantage over the wing cutting devices known from the prior art, in which deflection of the poultry carcass transversely to the transport direction is ruled out because the wings or wing parts are fixed on both sides simultaneously. Deflection in the transverse direction has the effect that the wing or wing part to be separated is in each case separated optimally in the first separating device, or in the second separating device, since the wings or wing parts can be positioned optimally for the separating cut because the poultry carcass is mounted without restricted guidance in the transverse direction.

The carrier elements are particularly preferably so configured that the poultry carcasses are conveyed in the transport direction in the carrier elements but are mounted to be movable at least in the transverse direction transversely to the transport direction. Further preferably, the carrier elements themselves are so configured that they are mounted to be displaceable transversely to the transport direction. Deflection of the poultry carcasses transversely to the transport direction is in this case achieved by a transverse displacement of the carrier elements themselves.

A preferred further development of the invention is distinguished in that the conveying device is in the form of an overhead conveyor for receiving the poultry carcasses suspended by their legs by means of the carrier elements. This offers the advantage, on the one hand, that the wing cutting apparatus according to the invention is so configured that it can be integrated directly into a poultry processing plant having an overhead conveyor system. In addition, overhead conveying offers the advantage that the poultry carcasses, because they are suspended from the carrier elements, are movable transversely or substantially transversely to the transport direction and, as described above, are therefore mounted to be correspondingly deflectable.

According to a further preferred embodiment of the invention, the first separating device and the second separating device comprise guiding devices, each of the guiding devices having a guiding gap extending parallel to the transport direction, and are configured to hold the wings or wing parts in one of the guiding gaps and guide them at least substantially parallel to the transport direction. The guiding devices ensure that the wings or wing parts to be separated are precisely aligned and positioned. In this manner, they are guided into an optional position for separation of the wings or wing parts during the continuous transportation of the poultry carcasses.

A further expedient embodiment of the invention is characterised in that the guiding gaps taper in the transport direction. The tapered guiding gaps have the effect that the wings or wing parts are displaced in the respective guiding gaps in such a manner that the joint region between the wing parts to be separated is aligned in the respective guiding gap. In other words, the guiding devices are thus so designed that they automatically "seek" the optimum separating point for the subsequent separating cut and thus precisely align and position the wing or wing parts to be separated.

According to a further preferred embodiment, a threading device is arranged upstream of each guiding device, which threading device is configured to thread the wing or wing part into the guiding gap. By means of the threading device, the wings or wing parts to be separated are fed to the guiding devices.

A further expedient embodiment of the invention is characterised in that a cutting means is arranged downstream of each guiding device, the cutting means being configured to separate the wing or wing part. In this manner, the separating cuts mentioned hereinbefore are carried out with high precision. By means of the guiding

devices, the wing or wing part to be separated is positioned and aligned exactly, owing to the transversely deflectable mounting of the poultry carcasses, so that the subsequent separating cut by means of the cutting means has the desired high precision. Anatomical differences between the poultry carcasses thus do not affect the precision of the separating cuts.

According to a further preferred embodiment of the invention, the cutting means are arranged to be stationary. This allows cutting means which are structurally as simple as possible to be used, which do not require much maintenance, meet hygiene requirements because they are easy to clean and, because they are structurally simple, are inexpensive.

An expedient embodiment of the invention is characterised in that each of the cutting means comprises two cutting edges forming a cutting gap, which cutting edges are configured to separate the wing or wing part. The cutting means thus perform a dual function. By means of the cutting edges, the wings or wing parts to be separated are positioned optimally and then separated.

A preferred further development of the invention is distinguished in that the cutting means are so arranged that a cutting plane formed by the cutting edges and the cutting gap is arranged inclined relative to the horizontal. In this manner, the cutting means are optimally adapted to the position assumed by the wings or wing parts of the poultry carcasses during conveying. On the one hand, this prevents parts of the poultry carcasses or of the wings or wing parts from colliding undesirably with the wing cutting apparatus according to the invention. On the other hand, the wing cutting device according to the invention is optimally adapted to the anatomical characteristics of the poultry carcasses that are to be processed.

According to a further preferred embodiment of the invention, it comprises a plurality of concurrent pushing elements which run along in the transport direction each in association with one of the carrier elements and are configured to come into engagement with the wing or wing parts. The pushing elements support the mentioned regions in the transport direction and contribute towards exact positioning during the separating operation.

A further expedient embodiment of the invention is characterised in that the pushing elements are further configured to come into engagement with the poultry carcass in a shoulder region. By additionally supporting the shoulder region, the side of the poultry carcass on which the wings or wing parts are separated is supported. In other words, the respective side of the poultry body is additionally fixed relative to the pushing element and the carrier element during conveying in the transport direction.

According to a further preferred embodiment, the pushing elements are each in the form of a U-shaped profile and each comprise a shoulder region pushing piece and a wing region pushing piece with a pushing piece recess located therebetween. The pushing elements are thus in the form of a particularly compact and simple structural unit. Preferably, the pushing elements are further each in one piece.

A further expedient embodiment of the invention is characterised in that the pushing elements are so arranged transversely to the transport direction that at least one of the guiding devices is arranged at least partially in the pushing piece recess. Optimal guiding of the wing or wing parts to be separated is achieved in this manner.

According to a further preferred embodiment of the invention, the pushing elements are driven by means of at least one drive unit for moving the pushing elements in the transport direction. By means of the drive unit, the pushing elements are actively moved in the transport direction in order actively to support the mentioned regions of the poultry carcass, or of the wings or wing parts, in the transport direction.

An expedient embodiment of the invention is characterised in that the drive speed of the drive unit is configured to be variably adjustable in such a manner that each of the pushing elements is configured to be in advance of or to lag behind the associated carrier element at least temporarily. This offers the advantage that the supporting force by means of which the pushing elements support the above-mentioned regions of the poultry carcass, or of the wings or wing parts, is configured to be variably adjustable.

The object is also achieved by a method having the features mentioned hereinbefore in that the wings or wing parts of a pair are each separated in succession by means of a first separating device and a second separating device. The time difference between the separation of the wings or wing parts by means of the first and second separating devices is therefore preferably so chosen that the separation of one of the wings or

wing parts is already complete before separation of the wing or wing parts remaining on the poultry carcass. This offers the advantage that the poultry carcasses are fixed during the separating operation on only one side, namely with the wing or wing part that is in engagement with one of the first separating device or the second separating device. The poultry carcass is consequently not fixed on both sides during the separation but is configured to be movable to a certain extent. Precise cutting – regardless of the size of the poultry carcasses – is thus ensured at all times.

A preferred further development of the invention is distinguished in that the poultry carcasses are held and conveyed by means of carrier elements in such a manner that the poultry carcasses are each mounted to be deflectable at least transversely to the transport direction. This offers the advantage that the poultry carcasses are not rigidly fixed transversely to the transport direction but are able to deflect in the transverse direction to a certain extent – depending on the size of the poultry carcass. This represents an important advantage over the wing cutting devices known from the prior art, in which deflection of the poultry carcass transversely to the transport direction is ruled out because the wings or wing parts are fixed on both sides. Deflection in the transverse direction has the effect that the wing or wing part to be separated is in each case separated optimally in the first separating device, or the second separating device, since the wings or wing parts can be positioned optimally for a precise separating cut because the poultry carcass is mounted without restricted guidance in the transverse direction.

According to a further preferred embodiment of the invention, the poultry carcasses are conveyed suspended by their legs by means of the carrier elements. The method according to the invention can thus easily be integrated into poultry processing systems with overhead conveying. In addition, overhead conveying offers the advantage that the poultry carcasses, because they are suspended from the carrier elements, are movable transversely or substantially transversely to the transport direction and, as described above, are therefore mounted to be correspondingly deflectable.

Further advantageous embodiments of the method according to the invention will be described in the following. The advantages arising therefrom have already been described comprehensively above in connection with the wing cutting apparatus according to the invention. Therefore, in order to avoid repetition, explicit reference is

made to the advantages mentioned there also in connection with the advantageous embodiments described in the following.

A further expedient embodiment of the invention is characterised by parallel guiding of the wings or wing parts by means of guiding devices which each have guiding gaps extending parallel to the transport direction.

According to a further preferred embodiment, the method according to the invention comprises threading the wings or wing parts into the respective guiding gap by means of a threading device.

A further expedient embodiment of the invention is characterised in that the wings or wing parts are separated by means of cutting means arranged downstream of the guiding devices.

According to a further preferred embodiment of the invention, the separation is carried out by means of cutting means which are arranged to be stationary.

An expedient embodiment of the invention is characterised in that the wings or wing parts are guided into a cutting gap formed by means of two cutting edges for separation thereof.

A preferred further development of the invention is distinguished in that the separation takes place by cutting in a cutting plane which is formed by the cutting edges and the cutting gap and which is inclined relative to the horizontal.

According to a further preferred embodiment of the invention, a plurality of concurrent pushing elements are each associated with in each case one of the carrier elements and run along in the transport direction in engagement with one of the wings wing parts.

A further expedient embodiment of the invention is characterised in that the carrier elements each come into engagement with the poultry carcass with a shoulder region.

According to a further preferred embodiment, the pushing elements are driven for movement in the transport direction by means of a drive unit.

A further expedient embodiment of the invention is characterised by at least temporary variation of the drive speed of the drive unit, so that each of the pushing elements is in advance of or lags behind the associated carrier element at least temporarily.

The object is further achieved by a corresponding method having the features mentioned hereinbefore in that the wings or wing parts of a pair are each separated in succession by means of a first separating device and a second separating device.

Further preferred and/or expedient features and embodiments of the invention will become apparent from the present patent specification. Particularly, preferred embodiments will be explained in greater detail with reference to the accompanying drawing, in which:

Fig. 1 is a first perspective view of the wing cutting apparatus according to the invention,

Fig. 2 is a second perspective view of the wing cutting apparatus according to the invention,

Fig. 3 is a third perspective view of the wing cutting apparatus according to the invention,

and

Fig. 4 is a front view of the wing cutting apparatus according to the invention, viewed in the transport direction.

The wing cutting apparatus according to the invention will be described in the following with reference to Figures 1 to 4. The following embodiments also serve to illustrate the method according to the invention.

Figure 1 shows a first perspective view of the wing cutting apparatus according to the invention. The wing cutting apparatus is configured and designed to process poultry carcasses 10, of which only one is shown in each of the figures for the sake of clarity. The poultry carcasses 10 are conveyed along a conveying line in a transport direction

11 by means of a conveying device 12. The conveying device 12 is indicated only schematically in the drawing.

Figures 1 and 2 each show the poultry carcass 10 in a first position, while the poultry carcass 10 in Figure 3 is shown in a second position, after the poultry carcass 10 has been conveyed further in the transport direction.

The wing cutting apparatus according to the invention comprises a first separating device 13 and a second separating device 14. The separating devices 13, 14 are designed to separate wings or wing parts 15 in pairs from one of the poultry carcasses 10. The first separating device 13 and the second separating device 14 are arranged offset along the conveying line in such a manner that the wings or wing parts 15 of a pair are each separated in succession.

Figure 1 shows how the poultry carcass 10 first passes the first separating device 13 as it is conveyed in the transport direction along the conveying line. The separating device 13 is configured to separate the wing or wing parts 15 from the right-hand side of the poultry carcass 10. The poultry carcass 10 then passes the second separating device 14. The separating device 14 is configured to separate the wing or wing parts 15 from the left-hand side of the poultry carcass 10. The illustrated order of separation of the wings or wing parts 15 is purely by way of example. Alternatively, the left-hand side of the poultry carcass 10 can also be processed first by means of the first separating device 13 and then the right-hand side of the poultry carcass 10 can be processed.

The poultry carcass 10 is advantageously – as is shown in the drawing – conveyed in the transport direction breast first. Alternatively, it is also possible to convey the poultry carcass with its back first.

The conveying device 12 preferably comprises carrier elements 16 for conveying and holding poultry carcasses 10. For reasons of clarity, only one of the carrier elements 16 is shown in the drawing. However, the conveying device 12 comprises a plurality of carrier elements 16. The carrier elements 16 are so configured and designed that the poultry carcasses 10 are mounted to be deflectable transversely to the transport direction 11, or substantially transversely to the transport direction 11.

The poultry carcass 10 is consequently mounted – as is shown in Figure 4 – with its centre axis 17 deflectable relative to a conveying axis 18 by means of the carrier elements 16 which are configured therefor. In particular, the poultry carcass 10 is thus mounted transversely or substantially transversely to the transport direction 11. In other words, the deflectable mounting is so configured that the poultry carcass 10 is configured with its centre axis 17 displaceable relative to the conveying axis 18. The centre axis 17 is a virtual axis which runs through the middle of the poultry carcass 10 and divides it into two halves.

The conveying axis 18 denotes an axis which runs vertically through the middle of one of the carrier elements 16 and which is perpendicular to the transport direction 11. The conveying axis 18 runs parallel to the Z-axis of the coordinate system shown in Figure 4. The transport direction 11 is directed into the XZ plane. The deflectable mounting of the poultry carcass 10 is so configured that the poultry carcass is able to deflect with its centre axis 17 on the one hand transversely to the transport direction 11, that is to say at least with a subcomponent in a transverse direction. In the drawing, the transverse direction denotes the X direction. This leads to the above-described displacement between the centre axis 17 and the conveying axis 18. The conveying axis 18 can be displaced both translationally, that is to say by displacement in the X direction, and by a pivot movement. A combined pivot/displacement movement leads to an inclined position of the centre axis 17 relative to the conveying axis 18. The deflectable mounting optionally further permits rotation of the poultry carcass 10 about the Z-axis, that is to say about the conveying axis 18.

The conveying device 12 is preferably in the form of an overhead conveyor, for receiving the poultry carcass 10 suspended by its legs 19 by means of the carrier elements 16. Further preferably, the carrier elements 16 are in the form of shackles and configured to receive the ankle joints of the poultry carcasses 10.

The first separating device 13 and the second separating device 14 each comprise guiding devices 20. Each of the guiding devices 20 has a guiding gap 21 which extends parallel to the transport direction 11. The guiding devices 20 are configured to hold the wings or wing parts 15 in one of the guiding gaps 21 and guide them at least substantially parallel to the transport direction 11.

According to a further advantageous embodiment of the invention, the guiding gaps 21 taper in the transport direction 11. This has the effect that the wings or wing parts 15 are guided into an optimal cutting position. As a result of the tapered guiding gaps 21, the wings or wing parts 15 are aligned in the guiding gaps 21 in such a manner that the joint regions of the wings or wing parts in particular are positioned exactly in the guiding gaps 21.

Further preferably, a threading device 22 is arranged upstream of each of the guiding devices 20. The threading devices 22 are configured to thread the wing or wing part 15 into the guiding gap 21, or into the respective guiding gaps 21. For example, the threading device 22 – as shown in the drawing – is in the form of a guide plate. Alternatively, however, the threading devices 22 can also be formed of one or more guide rods or the like.

According to a preferred embodiment, a cutting means 23 is arranged downstream of each of the guiding devices 20. By means of the cutting means 23, the wing or wing parts 15 are separated from the poultry carcass 10. The cutting means 23 are preferably arranged to be stationary. Further preferably, each of the cutting means 23 comprises two cutting edges 25 forming a cutting gap 24, which cutting edges are configured to separate the wing or wing part 15. The guiding devices 20, the cutting means 23 and the cutting edges 25 are in particular in one piece.

According to a further preferred embodiment, a cutting plane formed by the cutting edges 25 and the cutting gap 24 is arranged inclined relative to the horizontal. In other words, the cutting plane is arranged inclined relative to the X- or Z-axis. The cutting plane is particularly preferably arranged inclined by an angle which corresponds to the anatomical characteristics of the wing parts 15 of the poultry carcasses 10 that are to be separated. As is shown by way of example in the drawing, the cutting plane is aligned parallel or substantially parallel to the natural position of the upper wing part 26 of the poultry carcasses 10, so that the mid-wing part 27 is separated from the upper wing part 26 by means of the cutting means 23. By correspondingly specifying an angle of inclination of the cutting plane that is adapted to the anatomical characteristics, it is thus possible, for example, also to separate the wing tips 28 of the poultry carcasses 10 from the mid-wing part 27 and/or the upper wing part 26 from the poultry carcass 10.

A further preferred embodiment of the invention comprises a plurality of concurrent pushing elements 29. The cutting elements 29 are configured to run along in the transport direction 11 each in association with one of the carrier elements 16. The pushing elements 29 are further configured to come into engagement with the wing or wing parts 15. The pushing elements 29 are consequently designed to guide the wings or wing parts 15 that are to be separated.

The pushing elements 29 are further configured to come into engagement with the poultry carcass 10 in a shoulder region 30. The pushing elements 29 thus support both the poultry body 10 in its shoulder region 30 and the wing or wing parts 15 that are to be separated. To that end, the pushing elements 29 are preferably each in the form of a U-shaped profile and each have a shoulder region pushing piece 31 and a wing region pushing piece 32 with a pushing piece recess 33 located therebetween.

Further preferably, the pushing elements 29 are arranged transversely to the transport direction 11 in such a manner that at least one of the guiding devices 20 is arranged at least partially in the pushing piece recess 33. In other words, at least one of the guiding devices 20 is so arranged that the respective pushing element 29 surrounds it at least partially.

The pushing elements 29 are advantageously driven by means of at least one drive unit 34 – indicated only schematically in the drawing – for moving the pushing elements 29 in the transport direction 11. The drive unit 34 is, for example, in the form of a motor-driven, revolving endless conveyor. However, the present invention is not limited solely to the type of drive for the pushing elements 29 which has been described above merely by way of example.

According to a preferred further development, the drive speed of the drive unit 34 is configured to be variably adjustable in such a manner that each of the pushing elements 29 is configured to be in advance of or to lag behind the associated carrier element 16 at least temporarily. In other words, the drive speed of the drive unit 34 is configured to be variable in such a manner that one of the pushing elements 29 is in advance of or lags behind the associated carrier element 16. This advance or lag is either static, that is to say configured to be constantly adjustable during the processing operation, or configured to be definable as a drive speed curve, so that the drive speed is varied during the processing operation.

A receiving element 35 is preferably arranged along the conveying line and is configured to support the poultry carcasses 10 on the neck side.

Claims:

1. A wing cutting apparatus for processing poultry carcasses (10), comprising

a conveying device (12) configured to convey the poultry carcasses (10) along a conveying line in transport direction (11),

a first separating device (13) and a second separating device (14) which are designed to separate wings or wing parts (15) in pairs from one each of the poultry carcasses (10),

wherein

the first separating device (13) and the second separating device (14) are arranged offset along the conveying line in the transport direction (11) in such a manner that the wings or wing parts (15) of a pair are each separated in succession, and wherein the conveying device (12) comprises carrier elements (16) for conveying and holding the poultry carcasses (10),

characterised in that the carrier elements (16) are so configured that the poultry carcasses (10) are mounted to be deflectable at least substantially transversely to the transport direction (11).

2. Wing cutting apparatus according to claim 1, characterised in that the conveying device (12) is in the form of an overhead conveyor for receiving the poultry carcasses (10) suspended by their legs (19) by means of the carrier elements (16).

3. Wing cutting apparatus according to one of claims 1 or 2, characterised in that the first separating device (13) and the second separating device (14) comprise guiding devices (20), each of the guiding devices (20) having a guiding gap (21) extending parallel to the transport direction (11), and are configured to hold the wings or wing parts (15) in one of the guiding gaps (21) and to guide them at least substantially parallel to the transport direction (11).

4. Wing cutting apparatus according to claim 3, characterised in that the guiding gaps (21) are configured to taper in the transport direction (11).

5. Wing cutting apparatus according to claim 3 or 4, characterised in that a threading device (22) is arranged upstream of each guiding device (20), which threading device is configured to thread the wing or wing part (15) into the guiding gap (21).

6. Wing cutting apparatus according to any one of claims 3 to 5, characterised in that a cutting means (23) is arranged downstream of each guiding device (20), the cutting means (23) being configured to separate the wing or wing part (15).

7. Wing cutting apparatus according to claim 6, characterised in that the cutting means (23) are arranged to be stationary.

8. Wing cutting apparatus according to claim 6 or 7, characterised in that each of the cutting means (23) comprises two cutting edges (25) forming a cutting gap (24), which cutting edges are configured to separate the wing or wing part (15).

9. Wing cutting apparatus according to claim 8, characterised in that the cutting means (23) are so arranged that a cutting plane formed by the cutting edges (25) and the cutting gap (24) is arranged inclined relative to the horizontal.

10. Wing cutting apparatus according to any one of claims 3 to 9, further comprising a plurality of concurrent pushing elements (29) which run along in the transport direction (11) each in association with one of the carrier elements (16) and are configured to come into engagement with the wing or wing parts (15).

11. Wing cutting apparatus according to claim 10, characterised in that the pushing elements (29) are further configured to come into engagement with the corresponding poultry carcass (10) in a shoulder region (30).

12. Wing cutting apparatus according to claim 11, characterised in that the pushing elements (29) are each designed in the form of a U-shaped profile and each

comprise a shoulder region pushing piece (31) and a wing region pushing piece (32) with a pushing piece recess (33) located therebetween.

13. Wing cutting apparatus according to claim 12, characterised in that the pushing elements (29) are so arranged transversely to the transport direction (11) that at least one of the guiding devices (20) is arranged at least partially in the pushing piece recess (33).

14. Wing cutting apparatus according to any one of claims 10 to 13, characterised in that the pushing elements (29) are driven by means of at least one drive unit (34) for moving the pushing elements (29) in the transport direction (11).

15. Wing cutting apparatus according to claim 14, characterised in that the drive speed of the drive unit (34) is configured to be variably adjustable in such a manner that each of the pushing elements (29) is configured to be in advance of or to lag behind the associated carrier element (16) at least temporarily.

16. A method for separating wings or wing parts (15) from poultry carcasses (10), comprising the steps

- conveying the poultry carcass (10) along a conveying line in transport direction (11) by means of a conveying device (12),

- separating the wings or wing parts (11) in pairs from one of the poultry carcasses (10),

- separation in pairs of the wings or wing parts (11) is each performed in succession by means of a first separating device (13) and a second separating device (14),

characterised in that the poultry carcasses (10) are held and conveyed by means of carrier elements (16) in such a manner that the poultry carcasses (10) are each mounted to be deflectable at least transversely to the transport direction (11).

17. Method according to claim 16, characterised in that the poultry carcasses (10) are conveyed suspended by their legs (19) by means of the carrier elements (16).

18. Method according to claim 16 or 17, characterised by parallel guiding of the wings or wing parts (11) by means of guiding devices (20) which each have guiding gaps (21) extending parallel to the transport direction (11).

19. Method according to claim 18, characterised by threading the wings or wing parts (15) into the respective guiding gaps (21) by means of a threading device (22).

20. Method according to claim 18 or 19, characterised by separation of the wings or wing parts (15) by means of cutting means (23) arranged downstream of the guiding devices (20).

21. Method according to claim 20, characterised in that the separation is carried out by means of cutting means (23) which are arranged to be stationary.

22. Method according to any one of claims 19 to 21, characterised by guiding of the wings or wing parts (15) into a cutting gap (24) formed by means of two cutting edges (25) for separation thereof.

23. Method according to claim 22, characterised in that the separation takes place by cutting in a cutting plane which is formed by the cutting edges (25) and the cutting gap (24) and which is inclined relative to the horizontal.

24. Method according to any one of claims 18 to 23, characterised in that a plurality of concurrent pushing elements (29) are associated with in each case one of the carrier elements (16) and run along in the transport direction (11) in engagement with one of the wings or wing parts (15).

25. Method according to claim 24, further characterised in that the carrier elements (16) each come into engagement with the poultry carcasses (10) with a shoulder region (30).

26. Method according to claim 24 or 25, characterised in that the pushing elements (29) are driven for movement in the transport direction (11) by means of a drive unit (34).

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27. Method according to claim 26, characterised by at least temporary variation of the drive speed of the drive unit (34), so that each of the pushing elements (29) is in advance of or lags behind the associated carrier element (16) at least temporarily.

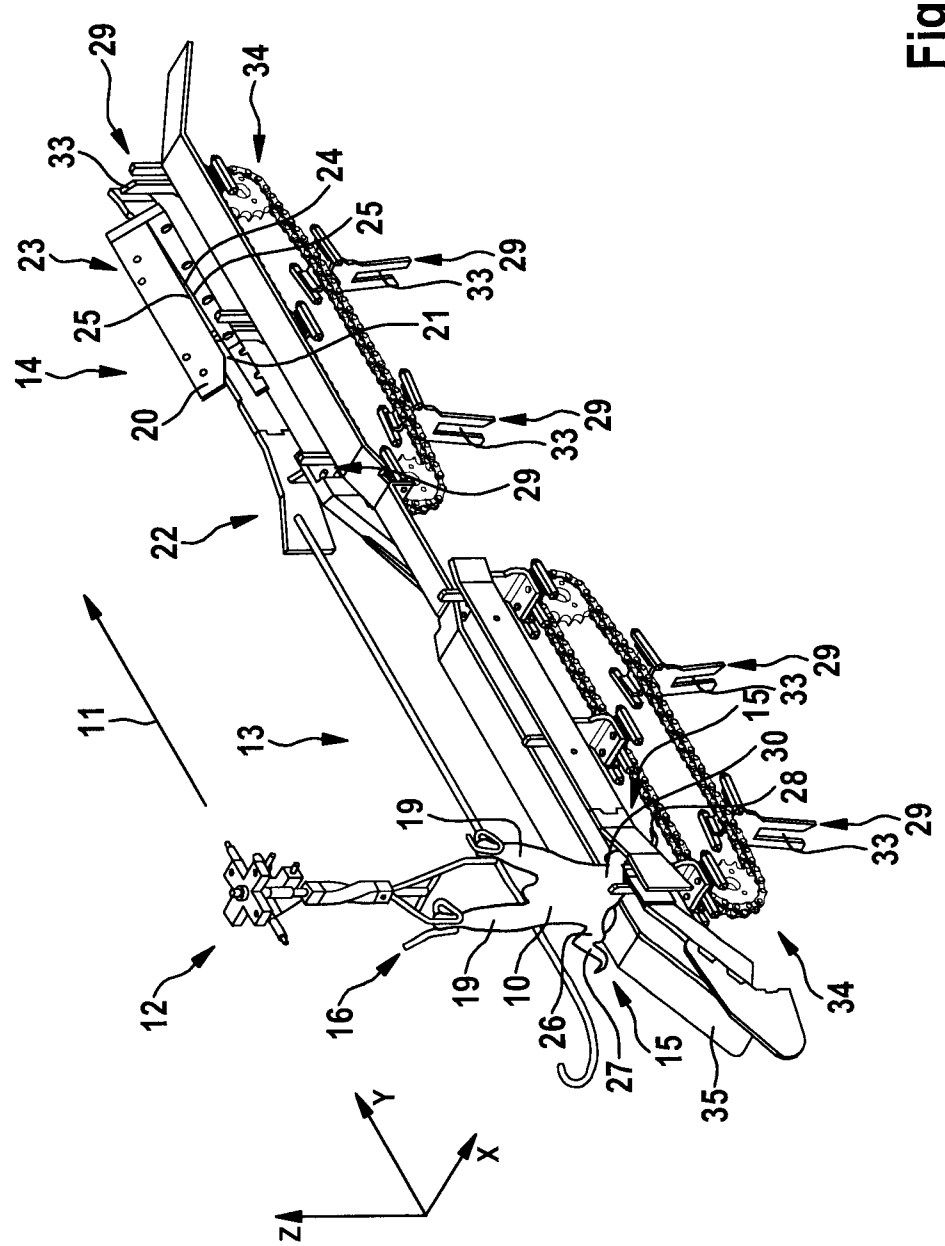
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Fig. 1

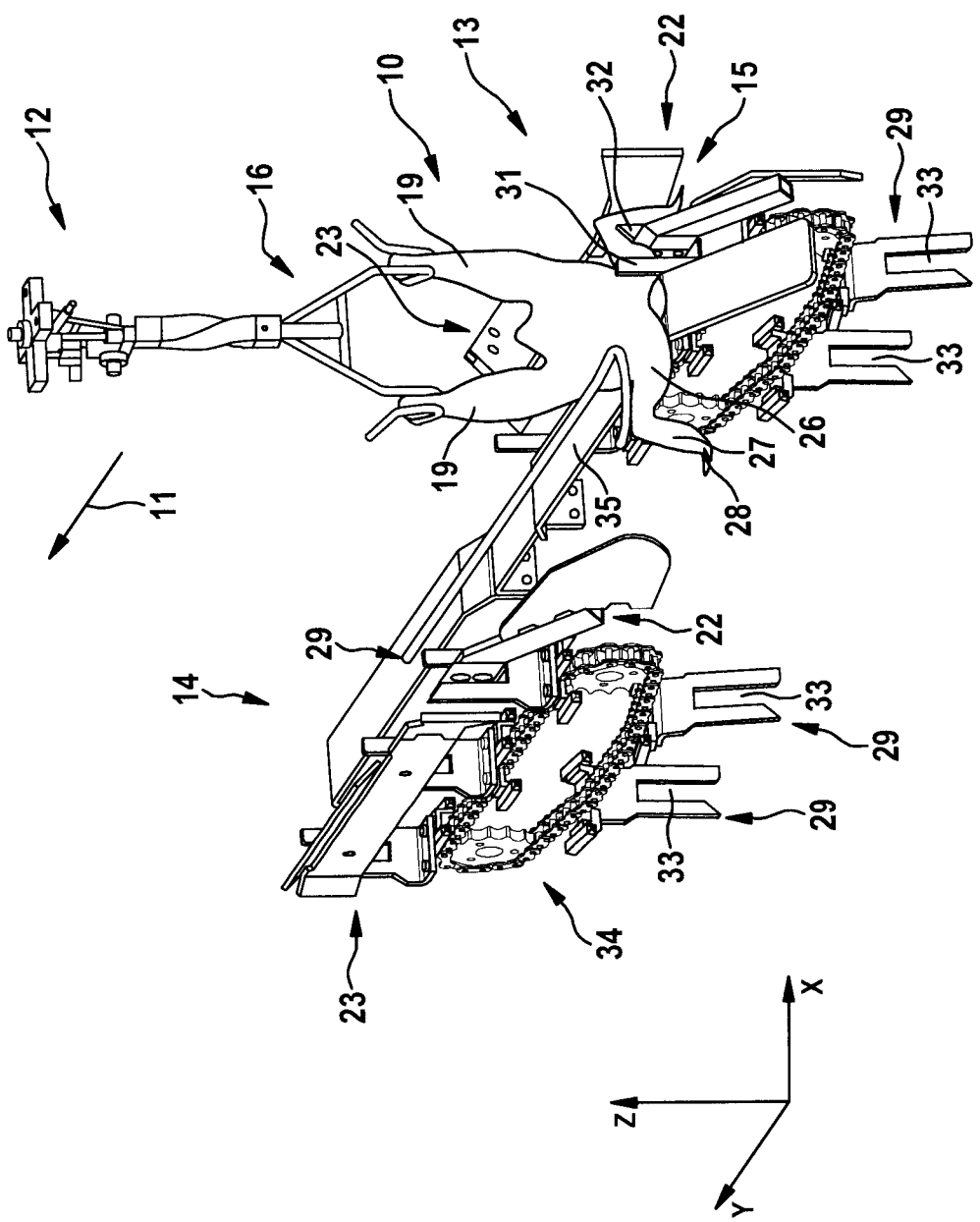
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Fig. 2

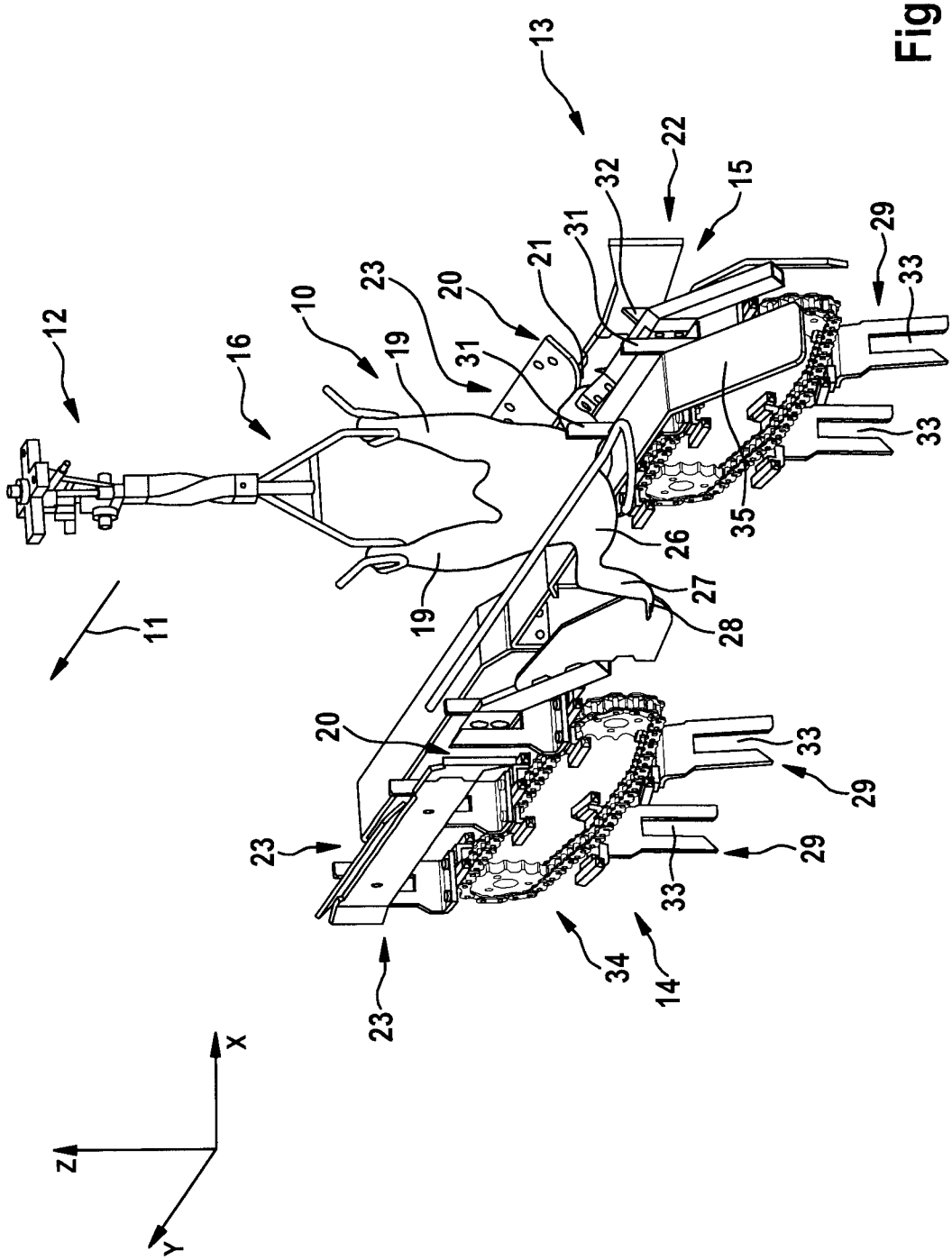
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Fig. 3

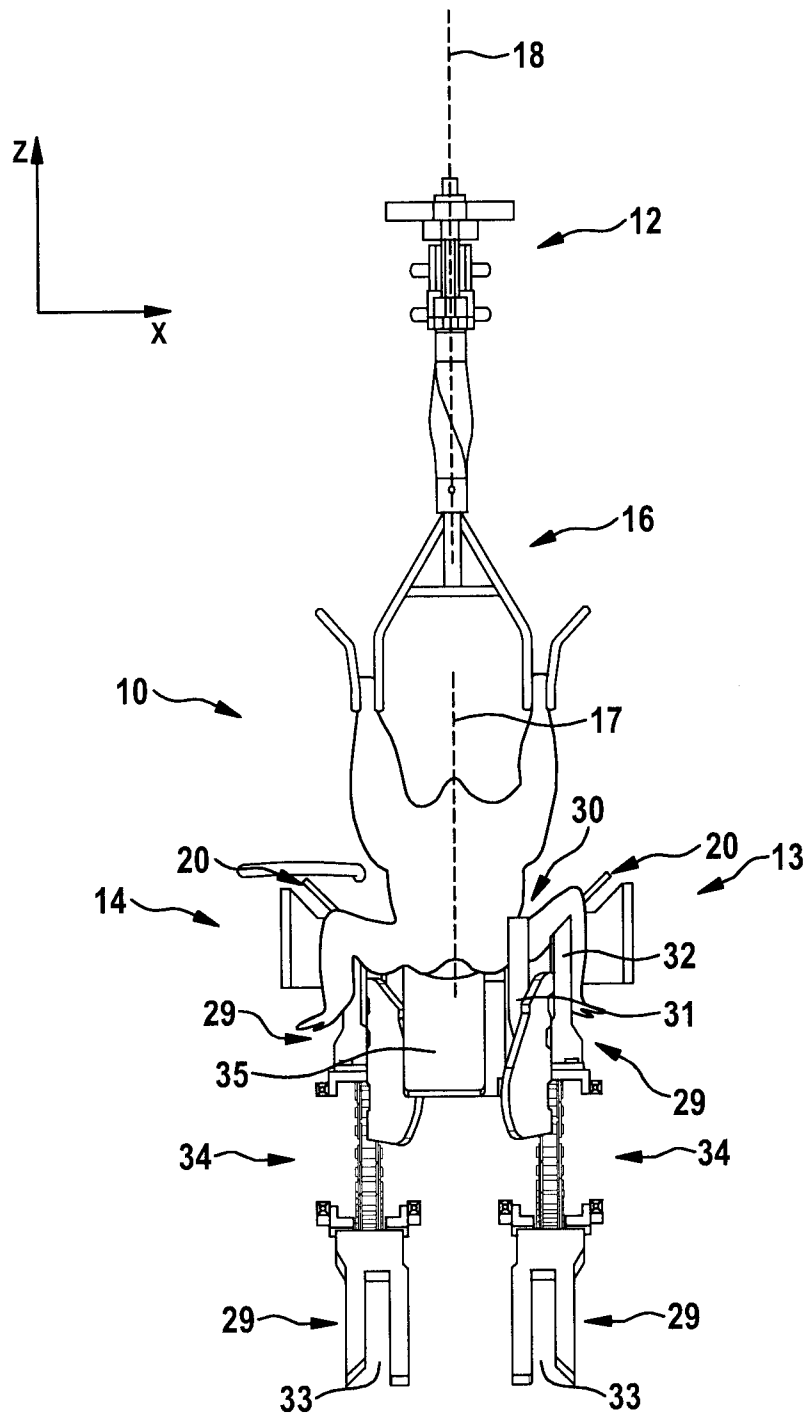

Fig. 4

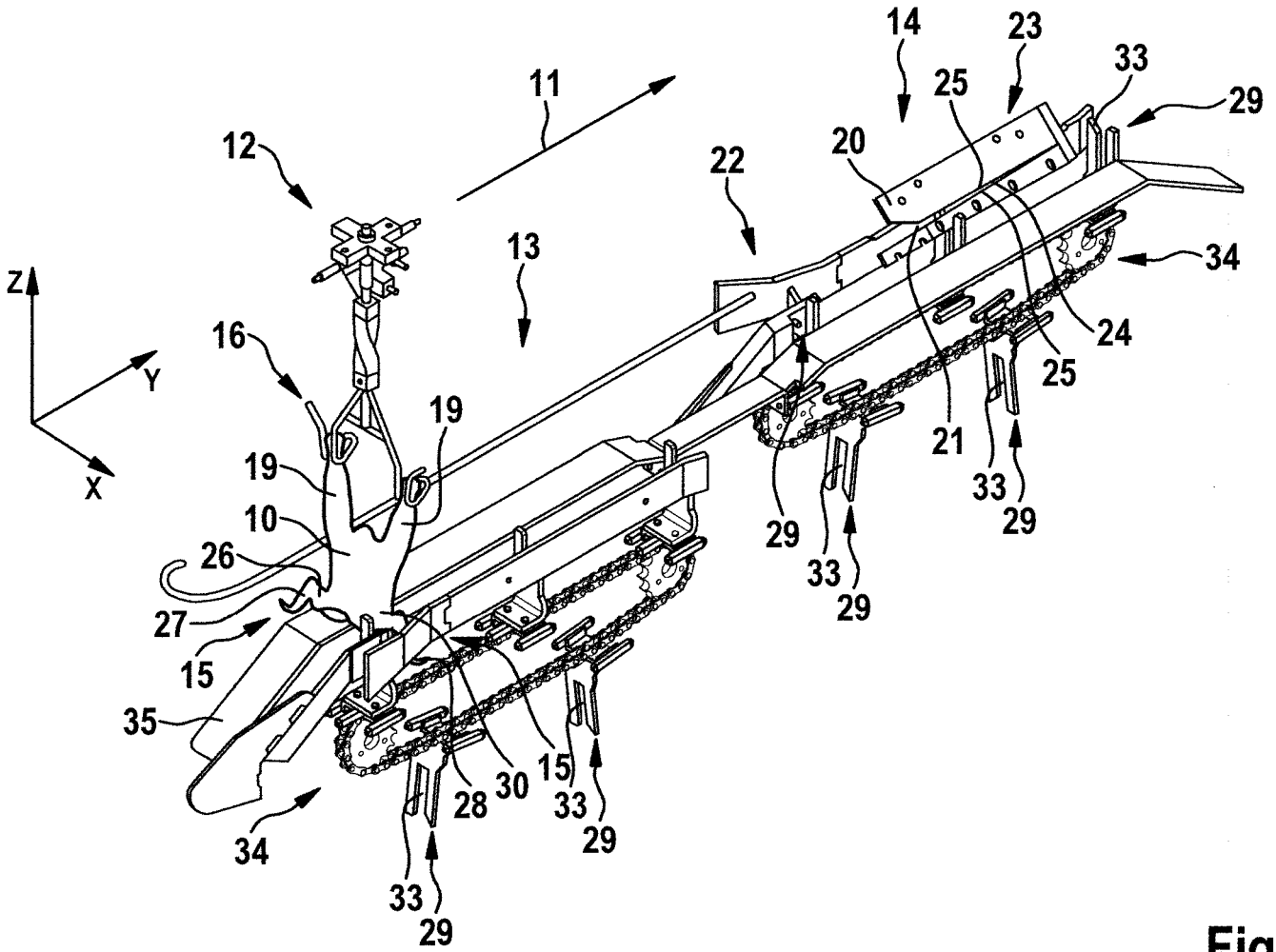
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Fig. 1