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(54) **WEFT FEEDER DEVICE**

SCHUSSFADENZUFÜHRERVORRICHTUNG

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Description

TECHNICAL FIELD AND PRIOR ART

[0001] The invention relates to a weft feeder device with a winding drum with an adjustable winding circumference for storing weft thread and with a drum axis, the winding drum comprising at least one drum segment, which drum segment is moveable in a radial direction of the drum axis for adjusting the winding circumference of the winding drum.

[0002] The drum segment could be a "resting drum segment", which is only moved with respect to a guiding structure upon adjusting the winding circumference, but which is not moved upon winding or unwinding a weft thread to or from the winding drum. The drum segment could also be a "feeding drum segment", which is moved with respect to a guiding structure upon adjusting the winding circumference and which is moved together with the guiding structure upon winding or unwinding a weft thread to or from the winding drum in order to advance a singular winding in a direction mainly parallel to the direction of the drum axis.

[0003] WO 2015/169611 A1 shows an adjustably arranged drum segment having two side legs, wherein a first side leg is a guiding leg and a second side leg is provided with a rack cooperating with a centrally arranged cogwheel for adjusting the winding circumference.

[0004] JP 09-170141 A1 shows a weft feeder device, the drum segments are each provided with a central leg extending in the radial direction of a drum axis, which central legs are guided in a respective guiding structure. The central legs are further provided with a rack, wherein to each rack a separate gear wheel is assigned. The gearwheels are coupled using a belt.

[0005] Upon operation, the drum segments generally are to be held fixed in position with respect to the guiding structure to maintain a set winding circumference. It is known to provide a wobbling or moving guiding structure for the feeding drum segments, which guiding structure is moved so that the feeding drum segments are moving back in a pattern for advancing the windings on the winding drum. Generally, such a wobbling movement is obtained by using an eccentric and inclined hub. When providing a wobbling guiding structure, the legs of the feeding drum segments still need to be fixed in position with respect to the guiding structure and/or a movement mechanism for moving the feeding drum segments with respect to the guiding structure in order to avoid excessive wear of the legs, the guiding structure and/or the movement mechanism and housing.

SUMMARY OF THE INVENTION

[0006] It is the object of the present invention to provide a weft feeder device comprising a winding drum with an adjustable winding circumference for storing weft thread, which is simple in design and allows a movement of drum segments of the winding drum with no or only little play.

[0007] This object is solved by a weft feeder device with the features of claim 1. Particular embodiments are defined in the dependent claims.

[0008] According to a first aspect, a weft feeder device comprising a winding drum with an adjustable winding circumference for storing weft thread and with a drum axis is provided, wherein the weft feeder device further comprises a drive mechanism that comprises a central drive wheel arranged coaxially with respect to the drum axis, wherein the winding drum comprises at least one drum segment mounted to a guiding structure so as to be moveable in a radial direction about the drum axis, wherein the drum segment comprises at least a first side leg extending along a side of the central drive wheel, wherein the first side leg is a driven leg drivingly coupled to the drive wheel, and wherein the drive mechanism further comprises at least one wire strand extending along the periphery of the central drive wheel for a motion transmission from the drive wheel to the driven leg, which at least one wire strand is fixed to the driven leg and to the central drive wheel.

[0009] The driven leg is connected to the drive wheel by means of the wire strand, such that when rotating the drive wheel via the wire strand a pulling force is applied to the driven leg for causing a movement of the driven leg and the associated drum segment for an adjustment of the winding circumference. The wire strand can be held under tension for avoiding a movement of the driven leg and, thus, of the associated drum segment during operation of the weft feeder device when the winding circumference is to be kept constant.

[0010] In one embodiment, the drum segment is moved in one direction by applying a pulling force using the wire strand and is moved in the opposite direction by means of an additional active or passive device, for example a passive element applying an internal restoring force.

[0011] In accordance with one particular embodiment, one wire strand or two wire strands is/are fixed to the driven leg at two distinct connection points, which are distanced from one another along the longitudinal direction of the driven leg, wherein the one wire strand or the two wire strands is/are fixed to the two connection points such that sections of the one or the two wire strands cross each other. Hence, by rotating the drive wheel in either direction, a pulling force is applied to the driven leg at either one of the two connection points. The length of the wire strand or the wire strands is chosen such that play is avoided. For adjusting the length, in one embodiment the one wire strand or the two wire strands are fixed to the drive wheel using a tensioning screw. In case the winding drum comprises a number of drum segments mounted to a guiding structure so as to be moveable in a radial direction about the drum axis, in one embodiment each driven leg is connected to the drive wheel using one or two designated wire strands.

[0012] In accordance with another embodiment, the winding drum comprises a number of drum segments mounted to a guiding structure so as to be moveable in a radial direction about the drum axis, wherein the drive mechanism comprises a number of wire strands, wherein the drum segments each comprise at least a first side leg extending along a side of the central drive wheel, which first side legs are driven legs drivingly coupled to the drive wheel, wherein each wire strand is fixed to the driven legs of at least two drum segments and each driven leg is connected to at least one wire strand such that all wire strands are interconnected with each other, and at least one wire strand is fixed to the central drive wheel. As all wire strands are interconnected, it is sufficient to fix one wire strand to the central drive wheel for drivingly coupling the central drive wheel with all wire strands and, thus, with all drum segments. In one embodiment, wire strands having at least one branching end, for connecting with two different driven legs are provided. In other embodiments, the wire strands have two unbranching ends.

[0013] In accordance with an embodiment, the winding drum comprises a number of drum segments mounted to a guiding structure so as to be moveable in a radial direction about the drum axis, wherein the drive mechanism comprises an associated number of wire strands, wherein the drum segments each comprise at least a first side leg extending along a side of the central drive wheel, which first side legs are driven legs drivingly coupled to the drive wheel, wherein each wire strand is fixed to the driven legs of two neighboring drum segments and at least one wire strand is fixed to the central drive wheel. As each wire strand is fixed to the driven legs of two neighboring drum segments, all wire strands are interconnected with each other and it is sufficient to fix one wire strand to the central drive wheel for drivingly coupling the central drive wheel with all wire strands and, thus, with all drum segments. In case the winding drum further comprises one or more fixedly mounted drum segment(s), such fixedly mounted drum segments could be arranged between two moveably arranged drum segments, wherein the moveably arranged drum segments are still referred to as neighboring drum segments in the context of the application.

[0014] In one embodiment, two wire strands are fixed to each driven leg at two distinct connection points, which are distanced from one another along the longitudinal direction of the driven leg, wherein the two wire strands are fixed to the two connection points such that sections of the two wire strands cross each other. The connection points in particular are chosen such that a pulling force is applied in an at least essentially tangential direction of the drive wheel, which is in parallel to the driven leg for avoiding forces acting on the driven leg that could cause a jamming of the drum segment in the guiding structure.

[0015] In one embodiment, the at least one wire strand or a selected one of a number of wire strands is fixed to the drive wheel with a fixation element. The fixation element for example is a bolt or screw, wherein in one embodiment a tension of the wire strand is settable by setting the fixation element. In case a number of wire strands is provided and all wire strands are interconnected with each other, by tensioning one of the wire strands all wire strands are tensioned. This allows for a very simple adjustment of the tension.

[0016] For adjusting the winding circumference, the drive wheel is driven to rotate in either direction for moving the drum segments. In one embodiment, a cogwheel is provided for driving the drive wheel.

[0017] In one embodiment, the at least one drum segment has a second side leg, wherein the first side leg and the second side leg extend along opposite sides of the central drive wheel, wherein the second side leg is a guiding leg extending in parallel to the radial direction of the winding drum, which guiding leg is moveably mounted to the guiding structure. In one embodiment, the driven leg and the guide leg are similar in length and both extend beyond the drum axis in a mid-position of the driven leg between a first position associated with a maximum winding circumference and a second position associated with a minimum winding circumference. In other embodiments, the guiding leg is shorter than the driven leg.

[0018] In one embodiment, the drum segments are resting drum segments, which are not moved when advancing windings of the weft thread. In particular embodiments, the drum segments are feeding drum segments, which together with the guiding structure are moved in a pattern for advancing windings of the weft thread on the winding drum. The drive wheel is also attached to and moved together with the guiding structure. Hence, when moving the drum segments together with the guiding structure, the driven legs are securely held in position by means of the at least one wire strand and an undesired movement of the drum segments with respect to the guiding structure is avoided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] In the following, an embodiment of the invention will be described in detail with reference to the drawings. Throughout the drawings, the same elements will be denoted by the same reference numerals.

Fig. 1 is a perspective view of three resting drum segments of a winding drum and a drive mechanism of a weft feeder device, the drive mechanism comprising a central drive wheel and three wire strands;

Fig. 2 is a perspective view similar to Fig. 1 without the central drive wheel;

Fig. 3 is a perspective view of the three wire strands of the drive mechanism of Fig. 1 together with three driven legs of drum segments of the winding drum;

Fig. 4 is a top view of parts of the weft feeder device of Fig. 1;

Fig. 5 is a top view of the parts of the weft feeder device similar to Fig. 4 without a cogwheel for driving the central drive wheel;

Fig. 6 is a top view of three drum segments together with three wire strands of the drive mechanism in a first position;

Fig. 7 is a top view of the three drum segments together with three wire strands of Fig. 6 in a second position;

Fig. 8 is a top view of the three drum segments together with three wire strands of Fig. 6 in a third position;

Fig. 9 is a schematic top view of a drum segment of a winding drum and a drive mechanism of a weft feeder device according to a second embodiment;

Fig. 10 is a schematic top view of drum segments of a winding drum and a drive mechanism of a weft feeder device according to the second embodiment of Fig. 9;

Fig. 11 is a perspective view of three feeding drum segments of a winding drum and a drive mechanism of a weft feeder device, the drive mechanism comprising a central drive wheel and three wire strands; and

Fig. 12 is a perspective view for both the feeding drum segments of Fig. 1 and the resting drum segments of Fig. 11.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0020] Fig. 1 shows in a perspective view parts of a weft feeder device having a winding drum 1 for storing weft thread (not shown) and a drive mechanism 2, namely three drum segments 3, 4, 5 of the winding drum 1 and a central drive wheel 6 and three wire strands 7, 8, 9 of the drive mechanism 2.

[0021] The drum segments 3, 4, 5 are mounted to a guiding structure (not shown) so as to be moveable in a radial direction about a drum axis 10, wherein upon moving the drum segments 3, 4, 5 in the radial direction a winding circumference of the winding drum 1 is adjustable. As known for example from WO2015/169611 A1 the winding drum 1 further comprises a fourth drum segment (not shown), which is arranged fixed in position. The drum segments 3, 4, 5 in one embodiment are so-called resting drum segments, which are only moved with respect to the guiding structure upon adjusting the winding circumference, but which are not moved upon winding or unwinding a weft thread to or from the winding drum 1.

[0022] In the embodiment shown, each of the three drum segments 3, 4, 5 shown comprises a first side leg and a second side leg extending along opposite sides of the central drive wheel 6. The first side legs are referred to as driven legs 11, 12, 13, wherein the driven legs 11, 12, 13 are drivingly coupled to the drive wheel 6. The second side legs are referred to as guiding legs 14, 15, 16, which are used for guiding the drum segments 3, 4, 5 in the guiding structure (not shown).

[0023] For a motion transmission from the drive wheel 6 to the driven legs 11, 12, 13 in the embodiment shown three wire strands 7, 8, 9 are provided, which are fixed to the driven legs 11, 12, 13 and to the central drive wheel 6.

[0024] Fig. 2 shows the drum segments 3, 4, 5 together with the wire strands 7, 8, 9 in a perspective view. Fig. 3 shows the three wire strands 7, 8, 9 of the drive mechanism 2 of Fig. 1 together with the three driven legs 11, 12, 13 of drum segments 3, 4, 5 of the winding drum 1 of Fig. 1.

[0025] As best seen in Fig. 3, each wire strand 7, 8, 9 is fixed to the driven legs 11, 12, 13 of two neighboring drum segments 3, 4, 5, such that all wire strands 7, 8, 9 are interconnected with each other. In the embodiment shown, two of the three wire strands 7, 8, 9 are fixed to each driven leg 11, 12, 13 at two distinct connection points 17, 22; 18, 19; 20, 21. More particular, a first wire strand 7 is fixed to a first driven leg 11 at a first connection point 17 and to a second driven leg 12 at a second connection point 18, a second wire strand 8 is fixed to the second driven leg 12 at a third connection point 19 and to a third driven leg 13 at a fourth connection point 20, and a third wire strand 9 is fixed to the third driven leg 13 at a fifth connection point 21 and to the first driven leg 11 at a sixth connection point 22. The connection points 17, 22; 18, 19; 20, 21 at each driven leg 11, 12, 13 are distanced from one another along the longitudinal direction of the driven leg 11, 12, 13. The connection points 17, 22; 18, 19; 20, 21 are chosen such that sections of two wire strands 7, 8, 9, which are fixed to an associated driven leg 11, 12, 13 cross each other. In the embodiment shown, one of the connection points 22, 18, 20 is arranged at a distal end of the associated driven leg 11, 12, 13, whereas the other connection point 17, 19, 21 is arranged about midway on the associated driven leg 11, 12, 13. A groove 29 is provided at each driven leg 11, 12, 13 for receiving the wire strands 7, 8, 9.

[0026] One of the wire strands 7, 8, 9, in the embodiment shown the third wire strand 9, is further fixed to the central drive wheel 6 (see Fig. 1) by means of a fixation element 23, which in the embodiment shown comprises a bolt or screw, wherein by rotating the bolt or screw of the fixation element 23 the associated wire strand 9 is tensioned by the fixation element 23. As in the embodiment shown, as best seen in Fig. 3, all wire strands 7, 8,

9 are interconnected with each other, by tensioning the third wire strand 9 fixed to the central drive wheel 6, the remaining wire strands 7, 8 are also tensioned. Hence, for reducing or avoiding a play in the drive system 2, all wire strands 7, 8, 9 can be simultaneously tensioned.

[0027] Fig. 4 is a top view of parts of the weft feeder device of Fig. 1 with the central drive wheel 6. As best seen in Fig. 4, a cogwheel 27 is provided coaxially to the drive wheel 6, wherein the drive wheel 6 is driven to rotate by means of the cogwheel 27. Fig. 5 is a top view of the parts of the weft feeder device similar to Fig. 4 without the cogwheel 27.

[0028] Fig. 6 is a top view of three drum segments 3, 4, 5 together with three wire strands 7, 8, 9 of the drive mechanism 2 in a first position, Fig. 7 is a top view of three drum segments 3, 4, 5 together with three wire strands 7, 8, 9 of the drive mechanism 2 in a second position, and Fig. 8 is a top view of three drum segments 3, 4, 5 together with three wire strands 7, 8, 9 of the drive mechanism 2 in a third position.

[0029] Starting from the position shown in Fig. 6, the drive wheel 6 (see Fig. 4 and 5) can be rotated counterclockwise, wherein in the embodiment shown, by rotating the drive wheel 6 counterclockwise, by means of the first wire strand 7 a pulling force is applied at the connection point 17 arranged midway of the first driven leg 11 and the first driven leg 11 is moved to the right, by means of the second wire strand 8 a pulling force is applied at the connection point 19 arranged midway of the second driven leg 12 and the second driven leg 12 is moved upwards, and by means of the third wire strand 9 a pulling force is applied at the connection point 21 arranged midway of the third driven leg 13 and the third driven leg 13 is moved to the left. It will be understood that the terms, left, right, upwards, and downwards in this context only refer to the drawing plane and not to any orientation of the elements in use. In other words, starting from the first position shown in Fig. 6, by rotating the drive wheel 6 counterclockwise, the driven legs 11, 12, 13 are moved in order to decrease the winding circumference via a second position shown in Fig. 7 into or towards a third position shown in Fig. 8.

[0030] Starting from Fig. 8, the drive wheel 6 can be rotated clockwise, wherein in the embodiment shown, by rotating the drive wheel 6 clockwise, by means of the third wire strand 9 a pulling force is applied at the connection point 22 arranged at the distal end of the first driven leg 11 and the first driven leg 11 is moved to the left, by means of the first wire strand 7 a pulling force is applied at the connection point 18 arranged at the distal end of the second driven leg 12 and the second driven leg 12 is moved downward, and by means of the second wire strand 8 a pulling force is applied at the connection point 20 arranged at the distal end of the third driven leg 13 and the third driven leg 13 is moved to the right. In other words, starting from the second position shown in Fig. 8, by rotating the drive wheel 6 clockwise, the driven legs 11, 12, 13 are moved in order to increase the winding circumference via a second position shown in Fig. 7 into or towards the first position shown in Fig. 6.

[0031] Fig. 9 schematically shows in a top view a drum segment 5 and a drive wheel 6 of a weft feeder device according to a second embodiment. In this embodiment, one designated wire strand 9 is provided for connecting the driven leg 13 of one drum segment 5 to the drive wheel 6. Similarly, as shown in Fig. 10, the weft feeder device may comprise further drum segments 3, 4 with designated wire strands 7, 8 for connecting the associated driven leg 11, 12 to the drive wheel 6. In this case, a tension of each wire strand 7, 8, 9 has to be carried out separately, for example by using an associated fixation element 25, 24, 23. The wire strand 7 is fixed to the driven leg 11 at two distinct connection points 17, 22, which are distanced from one another along the longitudinal direction of the driven leg 11, wherein sections of the wire strand 7, which are fixed to the driven leg 11 cross each other. Similarly, the wire strand 8 is fixed to the driven leg 12 at two distinct connection points 18, 19, while the wire strand 9 is fixed to the driven leg 13 at two distinct connection points 20, 21. In the embodiment shown, by rotating the drive wheel 6 clockwise, a pulling force is applied via the wire strand 7 at the connection point 22 arranged at the right in Fig. 10 and the driven leg 11 is moved to the left. Likewise, by rotating the drive wheel 6 counterclockwise, a pulling force is applied via the wire strand 7 at the connection point 17 arranged at the left in Fig. 10 and the driven leg 11 is moved to the right. Likewise, by rotating the drive wheel 6 counterclockwise, a pulling force is applied via the wire strand 8, 9 at the associated connection point 19, 21, while by rotating the drive wheel 6 clockwise, a pulling force is applied via the wire strand 8, 9 at the associated connection point 18, 20.

[0032] In other embodiments, as shown in Fig. 11, the drum segments 30, 40, 50 are so-called feeding drum segments, which are moved with respect to the guiding structure 26 upon adjusting the winding circumference and which are further moved together with the guiding structure 26 upon winding or unwinding a weft thread to or from the winding drum 1 in order to advance a singular winding in a direction mainly parallel to the direction of the drum axis 10. Each drum segment 30, 40, 50 comprises a driven leg 110, 120, 130 cooperating with a central drive wheel 60 and a guiding leg 140, 150, 160, which guiding leg 140, 150, 160 is moveably mounted to the guiding structure 26. In the embodiment shown in Fig. 11, the guiding structure 26 comprises boreholes for guiding the guiding legs 140, 150, 160, of which boreholes only the borehole 31 for the guiding leg 160 is partially visible. Further, the guiding structure 26 comprises guiding elements 33, 34, 35 for guiding an associated driven leg 110, 120, 130 with respect to the guiding structure 26. The central drive wheel 60 is for example driven similarly as the central drive wheel 6.

[0033] Three wire strands 7, 8, 9 are provided for a motion transmission from the drive wheel 60 to the driven legs 110, 120, 130. The three wire strands 7, 8, 9 are

interconnected via the driven legs 110, 120, 130 and one wire strand 9 is connected to the central drive wheel 60. The wire strands 7, 8, 9 and the fixation element 23 are designed similar as shown in Fig. 3. The wires 7, 8, 9 are driven via central drive wheel 60 that is driven similar as the drive wheel 6 in Fig. 1. Fig. 12 shows in perspective view of a weft feeder device with a first drum set comprising three resting drum segments 3, 4, 5 and a central drive wheel 6 as shown in Fig. 1 and a second drum set comprising three feeding drum segments 30, 40 50 and a central drive wheel 60 as shown in Fig. 11. which drum sets are both designed according to the invention. The central drive wheels 6, 60 are arranged at an axial distance, and can be driven together or separately.

[0034] Guiding structures 28, 26 are provided for guiding the guiding legs 14, 15, 16, 140, 150, 160 and/or the driven legs 11, 12, 13, 110, 120, 130 of the drum segments of the first drum set and the second drum set, respectively. The guiding structure 26 of the second drum set preferably is designed as shown in Fig. 11. In Fig. 12, a guiding structure 28 for guiding the guiding legs 14, 15, 16 and/or the driven legs 11, 12, 13 of the three resting drum segments 3, 4, 5 of the first drum set is shown schematically. The guiding structure 28 can be designed similar to the guiding structure 26 for the guiding legs 140, 150, 160 and/or the driven legs 110, 120, 130 of the drum segments 30, 40, 50 as shown in Fig. 11. Alternatively, the guiding structure can be designed similar to the guiding structure as shown in WO2015/169611 A1.

Claims

1. Weft feeder device comprising a winding drum (1) with an adjustable winding circumference for storing weft thread and with a drum axis (10), and comprising a drive mechanism (2) that comprises a central drive wheel (6, 60) arranged coaxially with respect to the drum axis (10), wherein the winding drum (1) comprises at least one drum segment (3, 4, 5; 30, 40, 50) mounted so as to be moveable in a radial direction about the drum axis (10), wherein the drum segment (3, 4, 5; 30, 40, 50) comprises at least a first side leg extending along a side of the central drive wheel (6, 60), wherein the first side leg is a driven leg (11, 12, 13; 110, 120, 130) drivingly coupled to the drive wheel (6, 60), **characterized in that** the drive mechanism (2) further comprises at least one wire strand (7, 8, 9) extending along the periphery of the central drive wheel (6, 60) for a motion transmission from the drive wheel (6, 60) to the driven leg (11, 12, 13; 110, 120, 130), which at least one wire strand (7, 8, 9) is fixed to the driven leg (11, 12, 13; 110, 120, 130) and to the central drive wheel (6, 60) .

2. Weft feeder device according to claim 1, **characterized in that** one wire strand (7, 8, 9) or two wire strands (7, 8, 9) is/are fixed to the driven leg (11, 12, 13; 110, 120, 130) at two distinct connection points (17, 18, 19, 20, 21, 22), which are distanced from one another along the longitudinal direction of the driven leg (11, 12, 13; 110, 120, 130), wherein the one wire strand (7, 8, 9) or the two wire strands (7, 8, 9) is/are fixed to the two connection points (17, 18, 19, 20, 21, 22) such that sections of the one or the two wire strands (7, 8, 9) cross each other.

3. Weft feeder device according to claim 1 or 2, **characterized in that** the winding drum (1) comprises a number of drum segments (3, 4, 5; 30, 40, 50) mounted so as to be moveable in a radial direction about the drum axis (10), wherein the drive mechanism (2) comprises a number of wire strands (7, 8, 9), wherein the drum segments (3, 4, 5; 30, 40, 50) each comprise at least a first side leg extending along a side of the central drive wheel (6, 60), which first side legs are driven legs (11, 12, 13; 110, 120, 130) drivingly coupled to the drive wheel (6, 60), wherein each wire strand (7, 8, 9) is fixed to the driven legs (11, 12, 13; 110, 120, 130) of at least two drum segments (3, 4, 5) and each driven leg (11, 12, 13; 110, 120, 130) is connected to at least one wire strand (7, 8, 9) such that all wire strands (7, 8, 9) are interconnected with each other, and at least one wire strand (7, 8, 9) is fixed to the central drive wheel (6, 60).

4. Weft feeder device according to any one of claims 1 to 3, **characterized in that** the winding drum (1) comprises a number of drum segments (3, 4, 5; 30, 40, 50) mounted so as to be moveable in a radial direction about the drum axis (10), wherein the drive mechanism (2) comprises an associated number of wire strands (7, 8, 9), wherein the drum segments (3, 4, 5; 30, 40, 50) each comprise at least a first side leg extending along a side of the central drive wheel (6, 60), which first side legs are driven legs (11, 12, 13; 110, 120, 130) drivingly coupled to the drive wheel (6, 60), wherein each wire strand (7, 8, 9) is fixed to the driven legs (11, 12, 13; 110, 120, 130) of two neighboring drum segments (3, 4, 5; 30, 40, 50) and at least one wire strand (7, 8, 9) is fixed to the central drive wheel (6, 60).

5. Weft feeder device according to claim 3 or 4, **characterized in that** two wire strands (7, 8, 9) are fixed to each driven leg (11, 12, 13; 110, 120, 130) at two distinct connection points (17, 18, 19, 20, 21, 22), which are distanced from one another along the longitudinal direction of the driven leg (11, 12, 13; 110, 120, 130), wherein the two wire strands (7, 8, 9) are fixed to the two connection points (17, 18, 19, 20, 21, 22) such that sections of the two wire strands (7, 8, 9) cross each other.

6. Weft feeder device according to any one of claims 1 to 5, **characterized in that** the at least one wire

strand (7, 8, 9) or a selected one of a number of wire strands (7, 8, 9) is fixed to the drive wheel (6, 60) with a fixation element (23, 24, 25).

7. Weft feeder device according to claim 6, **characterized in that** the at least one wire strand (7, 8, 9) is fixed to the drive wheel (6, 60) with a fixation element (23, 24, 25), wherein a tension of the wire strand (7, 8, 9) is settable by setting the fixation element (23, 24, 25).

8. Weft feeder device according to any one of claims 1 to 7, **characterized in that** a cogwheel (27) is provided for driving the drive wheel (6, 60).

9. Weft feeder device according to any one of claims 1 to 8, **characterized in that** the at least one drum segment has a second side leg, wherein the first side leg and the second side leg extend along opposite sides of the central drive wheel (6, 60), wherein the second side leg is a guiding leg (14, 15, 16; 140, 150, 160) extending in parallel to the radial direction of the winding drum (1), which guiding leg (14, 15, 16; 140, 150, 160) is moveably mounted to a guiding structure (26, 28).

10. Weft feeder device according to any one of claims 1 to 9, **characterized in that** the drum segments are feeding drum segments (30, 40, 50), which are moved in a pattern for advancing windings of the weft thread on the winding drum (1).

Patentansprüche

1. Schussfadenzuführvorrichtung, umfassend eine Wickeltrommel (1) mit einem einstellbaren Wickelumfang zum Speichern von Schussfaden und mit einer Trommelachse (10), und umfassend einen Antriebsmechanismus (2), der ein zentrales Antriebsrad (6, 60) umfasst, das koaxial bezüglich der Trommelachse (10) angeordnet ist, wobei die Wickeltrommel (1) mindestens ein Trommelsegment (3, 4, 5; 30, 40, 50) umfasst, das so montiert ist, dass es in einer radialen Richtung um die Trommelachse (10) beweglich ist, wobei das Trommelsegment (3, 4, 5; 30, 40, 50) mindestens einen ersten Seitenschenkel umfasst, der sich entlang einer Seite des zentralen Antriebsrades (6, 60) erstreckt, wobei der erste Seitenschenkel ein angetriebener Schenkel (11, 12, 13; 110, 120, 130) ist, der antriebsmässig mit dem Antriebsrad (6, 60) verbunden ist, **dadurch gekennzeichnet, dass** der Antriebsmechanismus (2) weiter mindestens einen Drahtstrang (7, 8, 9) umfasst, der sich entlang der Peripherie des zentralen Antriebsrades (6, 60) erstreckt für eine Bewegungsübertragung vom Antriebsrad (6, 60) auf den angetriebenen Schenkel (11, 12, 13; 110, 120, 130), welcher mindestens eine Drahtstrang (7, 8, 9) am angetriebenen Schenkel (11, 12, 13; 110, 120, 130) und am zentralen Antriebsrad (6, 60) befestigt ist.

2. Schussfadenzuführvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** ein Drahtstrang (7, 8, 9) oder zwei Drahtstränge (7, 8, 9) am angetriebenen Schenkel (11, 12, 13; 110, 120, 130) an zwei unterschiedlichen Verbindungspunkten (17, 18, 19, 20, 21, 22) befestigt ist/sind, die entlang der Längsrichtung des angetriebenen Schenkels (11, 12, 13; 110, 120, 130) voneinander beabstandet sind, wobei der eine Drahtstrang (7, 8, 9) oder die zwei Drahtstränge (7, 8, 9) so an den zwei Verbindungspunkten (17, 18, 19, 20, 21, 22) befestigt ist/sind, dass Abschnitte des einen oder der zwei Drahtstränge (7, 8, 9) einander kreuzen.

3. Schussfadenzuführvorrichtung nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Wickeltrommel (1) eine Anzahl von Trommelsegmenten (3, 4, 5; 30, 40, 50) umfasst, die so montiert sind, dass sie in einer radialen Richtung um die Trommelachse (10) beweglich sind, wobei der Antriebsmechanismus (2) eine Anzahl von Drahtsträngen (7, 8, 9) umfasst, wobei die Trommelsegmente (3, 4, 5; 30, 40, 50) jeweils mindestens einen ersten Seitenschenkel umfassen, der sich entlang einer Seite des zentralen Antriebsrades (6, 60) erstreckt, welche ersten Seitenschenkel angetriebene Schenkel (11, 12, 13; 110, 120, 130) sind, die antriebsmässig mit dem Antriebsrad (6, 60) verbunden sind, wobei jeder Drahtstrang (7, 8, 9) an den angetriebenen Schenkeln (11, 12, 13; 110, 120, 130) der mindestens zwei Trommelsegmente (3, 4, 5) befestigt ist und jeder angetriebene Schenkel (11, 12, 13; 110, 120, 130) mit mindestens einem Drahtstrang (7, 8, 9) derart verbunden ist, dass alle Drahtstränge (7, 8, 9) mit einander verschaltet sind, und mindestens ein Drahtstrang (7, 8, 9) am zentralen Antriebsrad (6, 60) befestigt ist.

4. Schussfadenzuführvorrichtung nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** die Wickeltrommel (1) eine Anzahl von Trommelsegmenten (3, 4, 5; 30, 40, 50) umfasst, die so montiert sind, dass sie in einer radialen Richtung um die Trommelachse (10) beweglich sind, wobei der Antriebsmechanismus (2) eine zugehörige Anzahl von Drahtsträngen (7, 8, 9) umfasst, wobei die Trommelsegmente (3, 4, 5; 30, 40, 50) jeweils mindestens einen ersten Seitenschenkel umfassen, der sich entlang einer Seite des zentralen Antriebsrades (6, 60) erstreckt, welche ersten Seitenschenkel angetriebene Schenkel (11, 12, 13; 110, 120, 130) sind, die antriebsmässig mit dem Antriebsrad (6, 60) verbunden sind, wobei jeder Drahtstrang (7, 8, 9) an den angetriebenen Schenkeln (11, 12, 13; 110, 120, 130)

von zwei benachbarten Trommelsegmenten (3, 4, 5; 30, 40, 50) befestigt ist und mindestens ein Drahtstrang (7, 8, 9) am zentralen Antriebsrad (6, 60) befestigt ist.

5. Schussfadenzuführvorrichtung nach Anspruch 3 oder 4, **dadurch gekennzeichnet, dass** zwei Drahtstränge (7, 8, 9) an jedem angetriebenen Schenkel (11, 12, 13; 110, 120, 130) an zwei unterschiedlichen Verbindungspunkten (17, 18, 19, 20, 21, 22) befestigt sind, die entlang der Längsrichtung des angetriebenen Schenkels (11, 12, 13; 110, 120, 130) voneinander beabstandet sind, wobei die zwei Drahtstränge (7, 8, 9) derart an den zwei Verbindungspunkten (17, 18, 19, 20, 21, 22) befestigt sind, dass Abschnitte der zwei Drahtstränge (7, 8, 9) einander kreuzen.

6. Schussfadenzuführvorrichtung nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** der mindestens eine Drahtstrang (7, 8, 9) oder ein ausgewählter von einer Anzahl von Drahtsträngen (7, 8, 9) mit einem Befestigungselement (23, 24, 25) am Antriebsrad (6, 60) befestigt ist.

7. Schussfadenzuführvorrichtung nach Anspruch 6, **dadurch gekennzeichnet, dass** der mindestens eine Drahtstrang (7, 8, 9) mit einem Befestigungselement (23, 24, 25) am Antriebsrad (6, 60) befestigt ist, wobei eine Spannung des Drahtstrangs (7, 8, 9) durch Einstellen des Befestigungselements (23, 24, 25) einstellbar ist.

8. Schussfadenzuführvorrichtung nach einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** zum Antreiben des Antriebsrades (6, 60) ein Zahnrad (27) vorgesehen ist.

9. Schussfadenzuführvorrichtung nach einem der Ansprüche 1 bis 8, **dadurch gekennzeichnet, dass** das mindestens eine Trommelsegment einen zweiten Seitenschenkel aufweist, wobei der erste Seitenschenkel und der zweite Seitenschenkel sich entlang gegenüberliegender Seiten des zentralen Antriebsrades (6, 60) erstrecken, wobei der zweite Seitenschenkel ein Führungsschenkel (14, 15, 16; 140, 150, 160) ist, der sich parallel zur radialen Richtung der Wickeltrommel (1) erstreckt, welcher Führungsschenkel (14, 15, 16; 140, 150, 160) beweglich an einer Führungsstruktur (26, 28) montiert ist.

10. Schussfadenzuführvorrichtung nach einem der Ansprüche 1 bis 9, **dadurch gekennzeichnet, dass** die Trommelsegmente Zuführtrommelsegmente (30, 40, 50) sind, die in einem Muster bewegt werden, um die Wicklungen des Schussfadens auf der Wickeltrommel (1) vorzuschieben.

Revendications

1. Dispositif délivreur de trame comprenant un tambour d'enroulement (1) avec une circonférence d'enroulement réglable pour stocker fil de trame et avec un axe de tambour (10), et comprenant un mécanisme d'entraînement (2) qui comprend une roue d'entraînement (6, 60) centrale disposée coaxialement par rapport à l'axe de tambour (10), dans lequel le tambour d'enroulement (1) comprend au moins un segment de tambour (3, 4, 5; 30, 40, 50) qui est monté de manière à être déplaçable dans une direction radiale autour de l'axe de tambour (10), dans lequel le segment de tambour (3, 4, 5; 30, 40, 50) comprend au moins une première branche latérale s'étendant le long d'un côté de la roue d'entraînement (6, 60) centrale, dans laquelle la première branche latérale est une branche entraînée (11, 12, 13; 110, 120, 130) couplée par entraînement à la roue d'entraînement (6, 60), **caractérisé en ce que** le mécanisme d'entraînement (2) comprend en outre au moins un toron de fil (7, 8, 9) s'étendant le long de la périphérie de la roue d'entraînement (6, 60) centrale pour une transmission de mouvement de la roue d'entraînement (6, 60) à la branche entraînée (11, 12, 13; 110, 120, 130), lequel au moins un toron de fil (7, 8, 9) est fixé à la branche entraînée (11, 12, 13; 110, 120, 130) et à la roue d'entraînement (6, 60) centrale.

2. Dispositif délivreur de trame selon la revendication 1, **caractérisé en ce qu'**un toron de fil (7, 8, 9) ou deux torons de fil (7, 8, 9) est/sont fixé(s) à la branche entraînée (11, 12, 13; 110, 120, 130) aux deux points de connexion (17, 18, 19, 20, 21, 22) distincts, qui sont éloignés l'un de l'autre le long de la direction longitudinale de la branche entraînée (11, 12, 13; 110, 120, 130), dans lequel l'un toron de fil (7, 8, 9) ou les deux torons de fil (7, 8, 9) est/sont fixé(s) aux deux points de connexion (17, 18, 19, 20, 21, 22) de sorte que des sections de l'un ou des deux torons de fil (7, 8, 9) se croisent l'une à l'autre.

3. Dispositif délivreur de trame selon la revendication 1 ou 2, **caractérisé en ce que** le tambour d'enroulement (1) comprend un nombre de segments de tambour (3, 4, 5; 30, 40, 50) montés de manière à être déplaçables dans une direction radiale autour de l'axe de tambour (10), dans lequel le mécanisme d'entraînement (2) comprend un nombre de torons de fil (7, 8, 9), dans lequel les segments de tambour (3, 4, 5; 30, 40, 50) comprennent chacun au moins une première branche latérale s'étendant le long d'un côté de la roue d'entraînement (6, 60) centrale, lesquelles premières branches latérales sont des branches entraînées (11, 12, 13; 110, 120, 130) couplées par entraînement à la roue d'entraînement (6, 60), dans lequel chaque toron de fil (7, 8, 9) est fixé aux branches entraînées (11, 12, 13; 110, 120, 130)

d'au moins deux segments de tambour (3, 4, 5) et chaque branche entraînée (11, 12, 13; 110, 120, 130) est connectée à au moins un toron de fil (7, 8, 9) de sorte que tous les torons de fil (7, 8, 9) sont interconnectés l'un à l'autre, et au moins un toron de fil (7, 8, 9) est fixé à la roue d'entraînement (6, 60) centrale.

4. Dispositif délivreur de trame selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** le tambour d'enroulement (1) comprend un nombre de segments de tambour (3, 4, 5; 30, 40, 50) monté de manière à être déplaçable dans une direction radiale autour de l'axe de tambour (10), dans lequel le mécanisme d'entraînement (2) comprend un nombre associé de torons de fil (7, 8, 9), dans lequel les segments de tambour (3, 4, 5; 30, 40, 50) comprennent chacun au moins une première branche latérale s'étendant le long d'un côté de la roue d'entraînement (6, 60) centrale, lesquelles premières branches latérales sont des branches entraînées (11, 12, 13; 110, 120, 130) couplées par entraînement à la roue d'entraînement (6, 60), dans lequel chaque toron de fil (7, 8, 9) est fixé aux branches entraînées (11, 12, 13; 110, 120, 130) des deux segments de tambour (3, 4, 5; 30, 40, 50) voisins et au moins un toron de fil (7, 8, 9) est fixé à la roue d'entraînement (6, 60) centrale.

5. Dispositif délivreur de trame selon la revendication 3 ou 4, **caractérisé en ce que** deux torons de fil (7, 8, 9) sont fixés à chaque branche entraînée (11, 12, 13; 110, 120, 130) aux deux points de connexion (17, 18, 19, 20, 21, 22) distincts, qui sont éloignés l'un de l'autre le long de la direction longitudinale de la branche entraînée (11, 12, 13; 110, 120, 130), dans lequel les deux torons de fil (7, 8, 9) sont fixés aux deux points de connexion (17, 18, 19, 20, 21, 22) de sorte que des sections des deux torons de fil (7, 8, 9) se croisent l'une à l'autre.

6. Dispositif délivreur de trame selon l'une quelconque des revendications 1 à 5, **caractérisé en ce que** l'au moins un toron de fil (7, 8, 9) ou un sélectionné parmi un nombre de torons de fil (7, 8, 9) est fixé à la roue d'entraînement (6, 60) avec un élément de fixation (23, 24, 25).

7. Dispositif délivreur de trame selon la revendication 6, **caractérisé en ce que** l'au moins un toron de fil (7, 8, 9) est fixé à la roue d'entraînement (6, 60) avec un élément de fixation (23, 24, 25), dans lequel une tension du toron de fil (7, 8, 9) peut être réglée en réglant l'élément de fixation (23, 24, 25).

8. Dispositif délivreur de trame selon l'une quelconque des revendications 1 à 7, **caractérisé en ce qu'**une roue dentée (27) est prévue pour entraîner la roue d'entraînement (6, 60).

9. Dispositif délivreur de trame selon l'une quelconque des revendications 1 à 8, **caractérisé en ce que** l'au moins un segment de tambour présente une deuxième branche latérale, dans lequel la première branché latérale et la deuxième branché latérale s'étendent le long des côtés opposés de la roue d'entraînement (6, 60) centrale, dans laquelle la deuxième branché latérale est une branche de guidage (14, 15, 16; 140, 150, 160) s'étendant parallèlement à la direction radiale du tambour d'enroulement (1), laquelle branche de guidage (14, 15, 16; 140, 150, 160) est montée de manière déplaçable à une structure de guidage (26, 28).

10. Dispositif délivreur de trame selon l'une quelconque des revendications 1 à 9, **caractérisé en ce que** les segments de tambour sont des segments de tambour d'alimentation (30, 40, 50), qui sont déplacés selon un rapport pour avancer les enroulements du fil de trame sur le tambour d'enroulement (1).

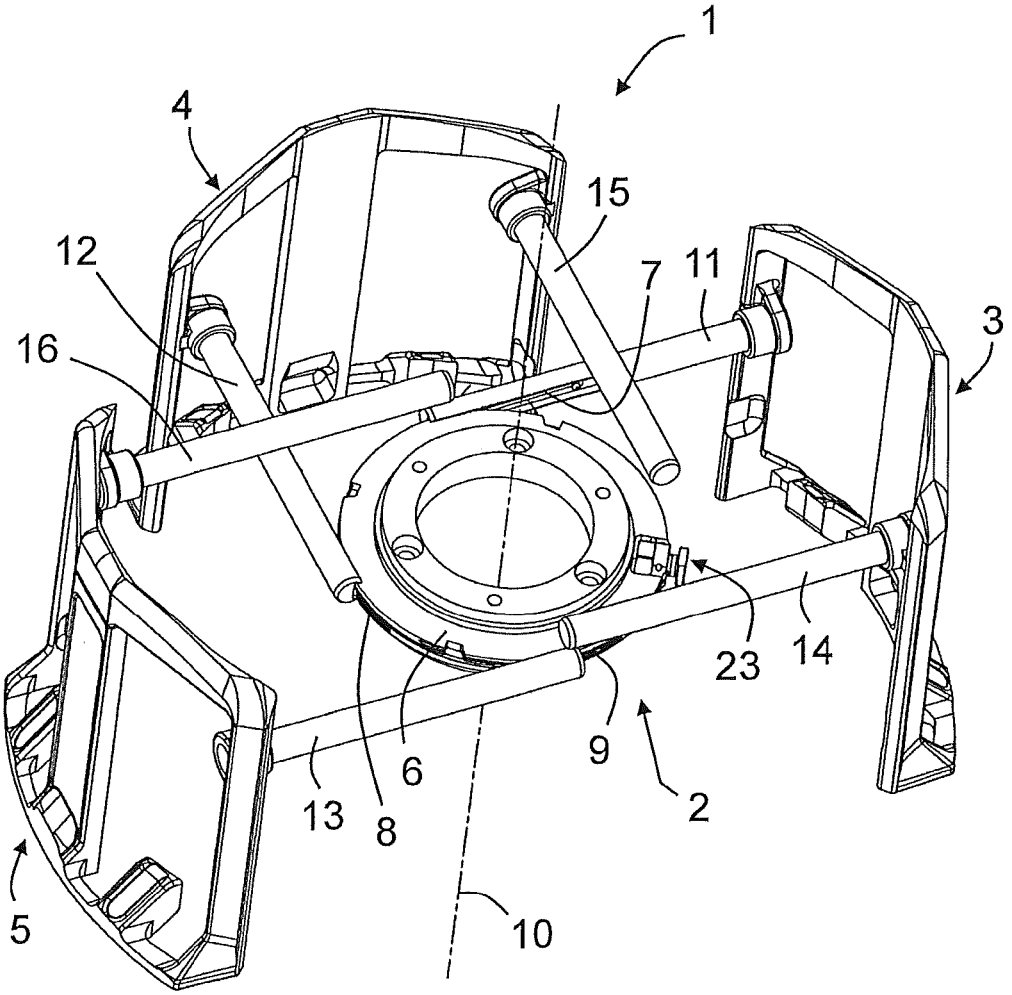


Fig. 1

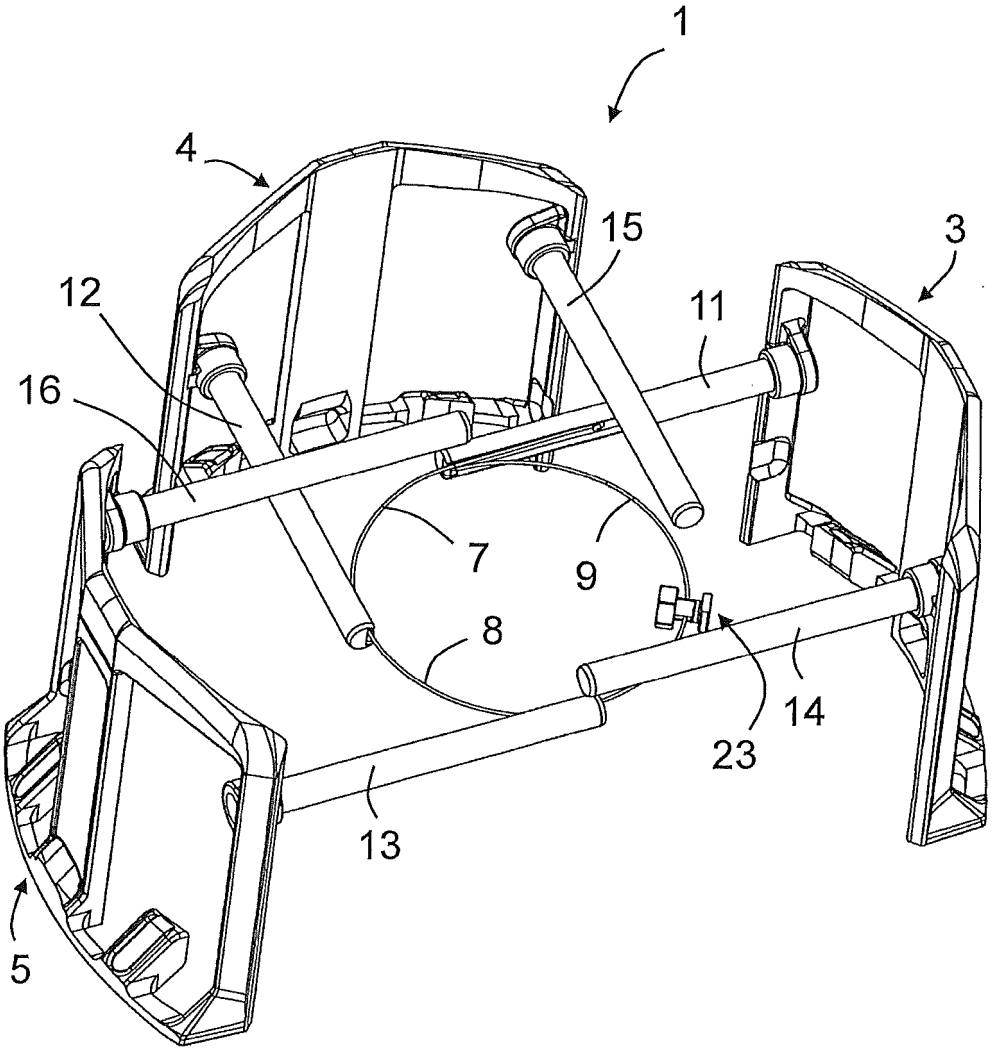


Fig. 2

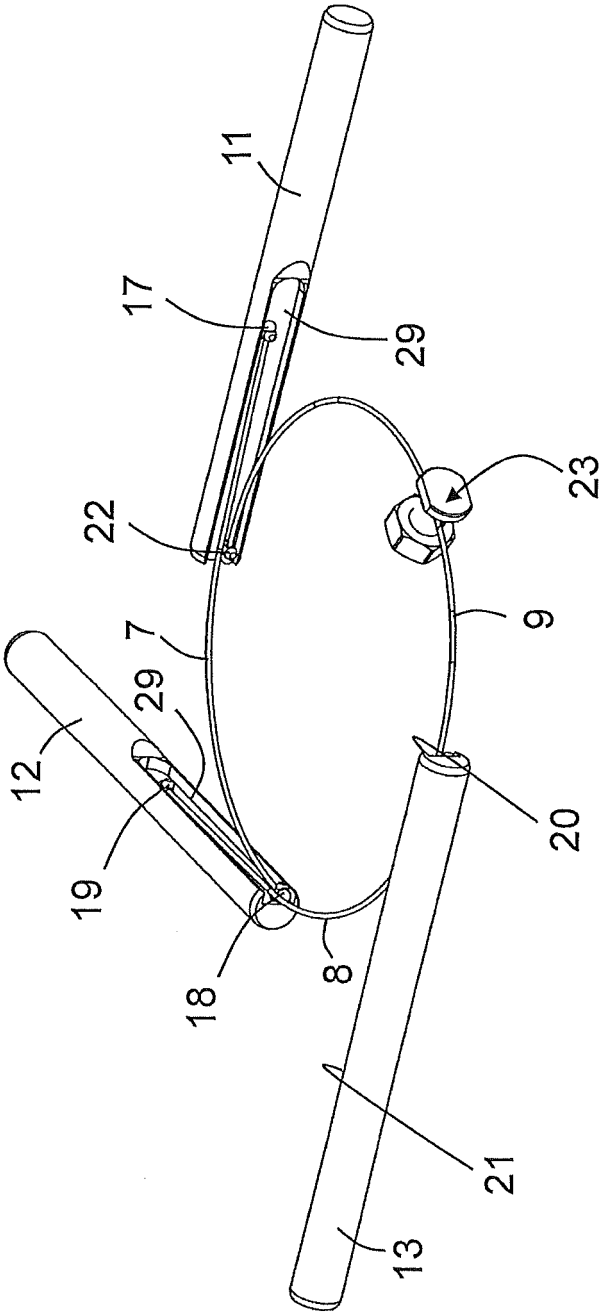


Fig. 3

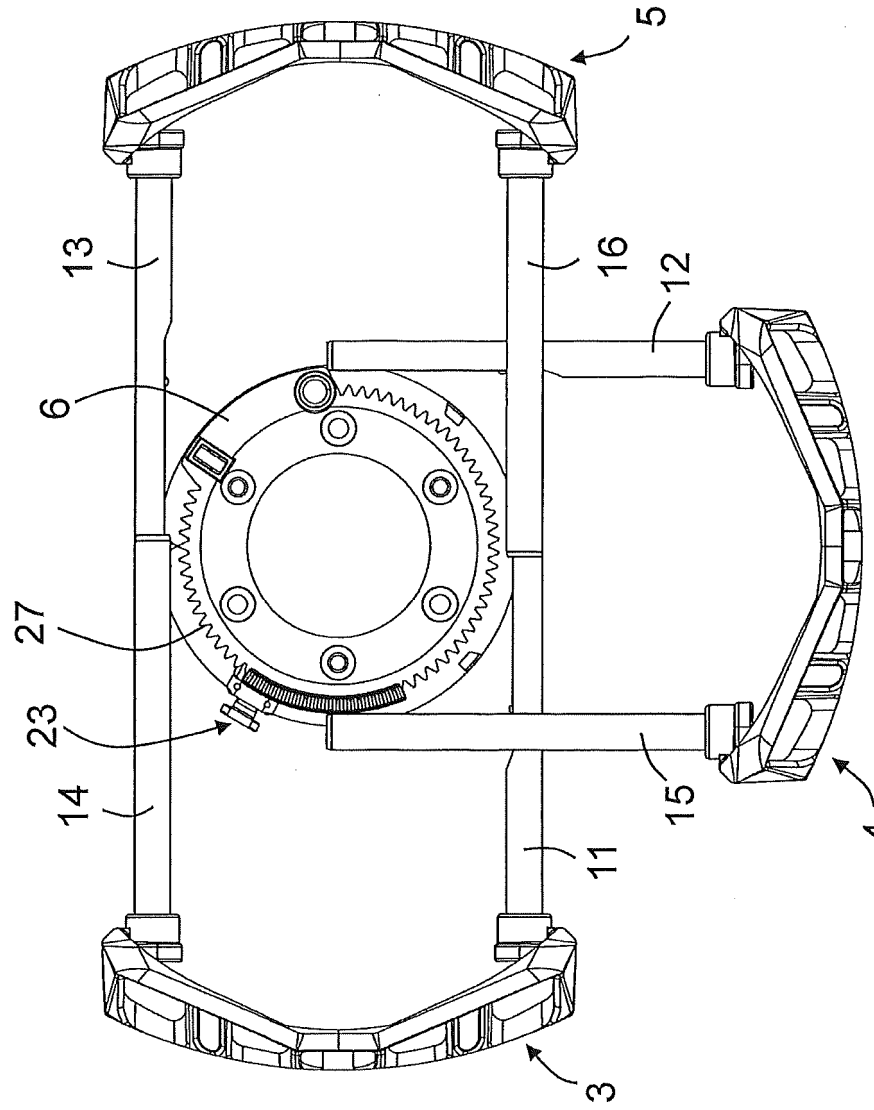


Fig. 4

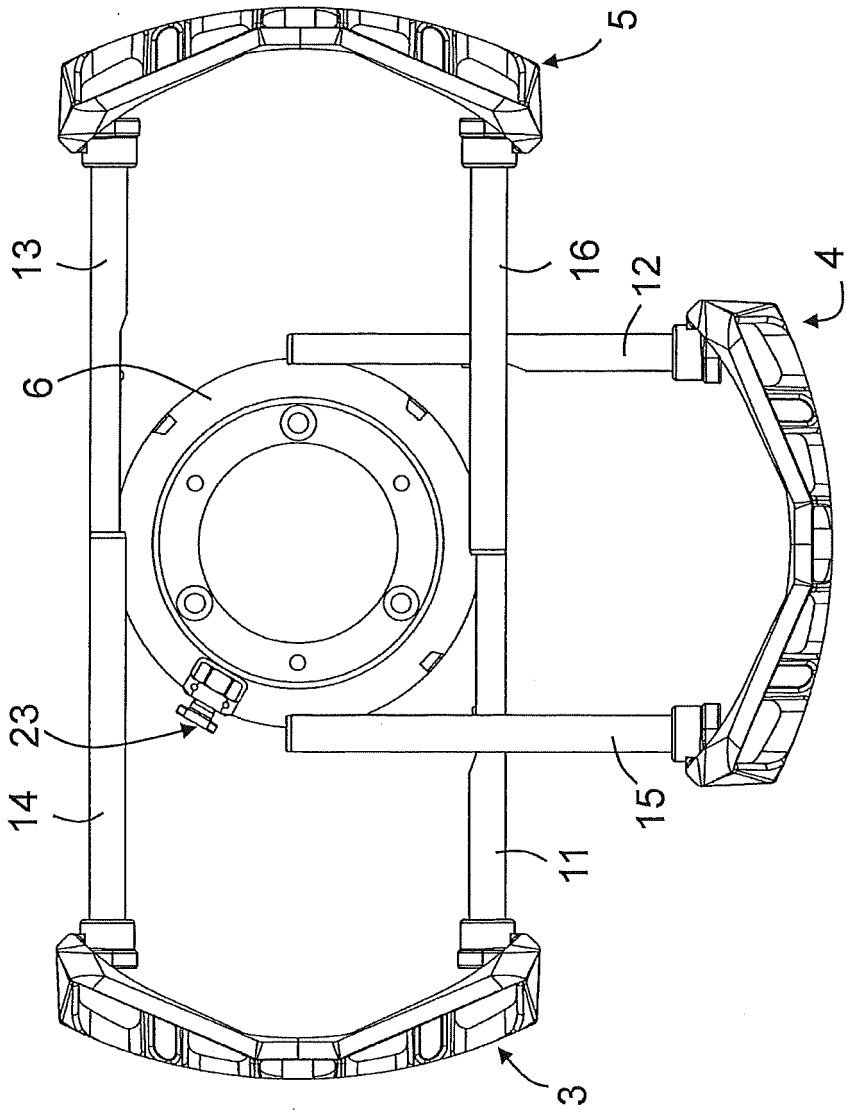


Fig. 5

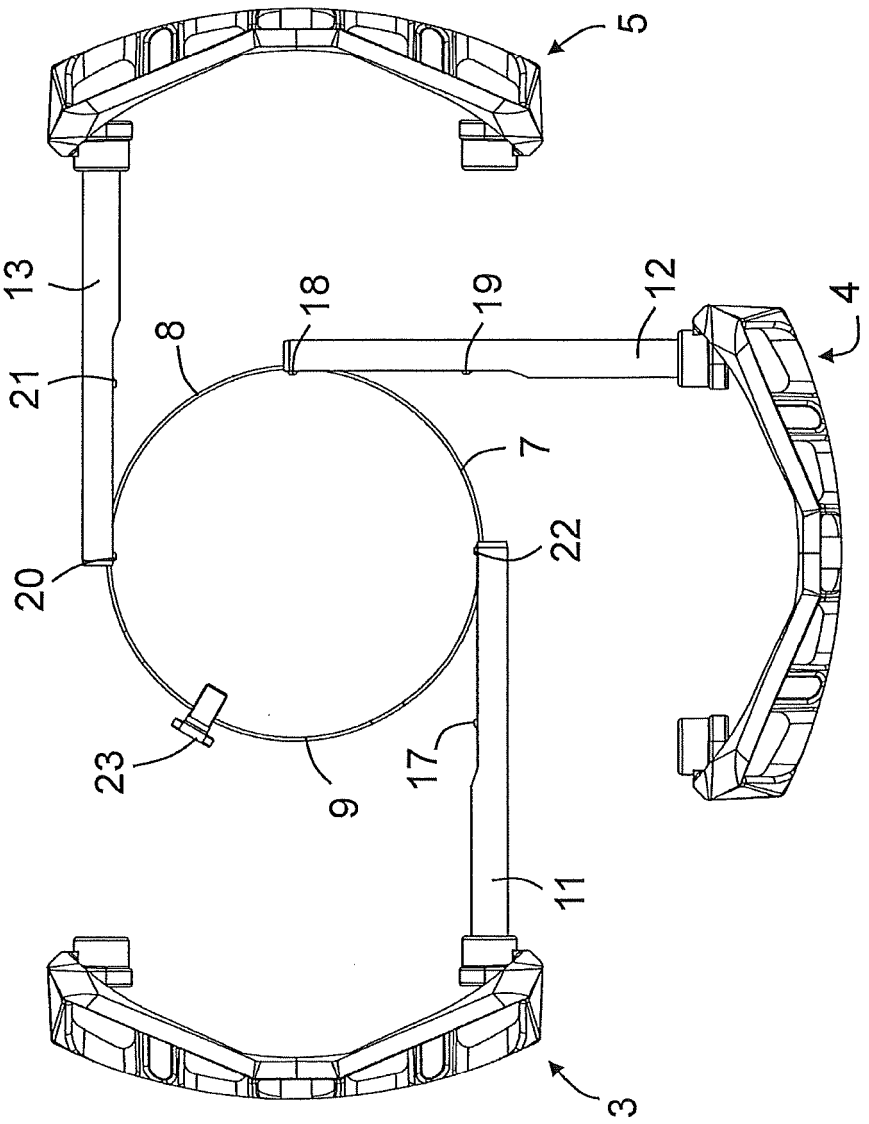


Fig. 6

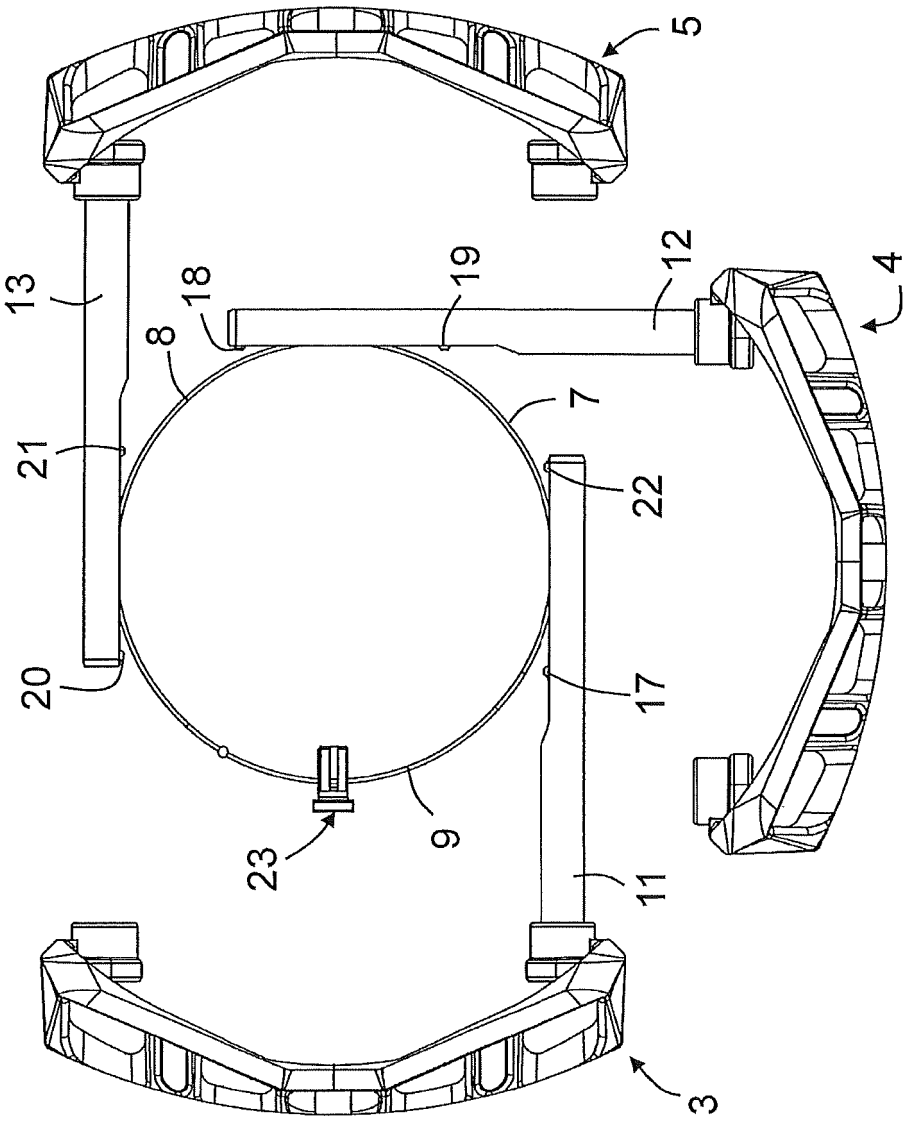


Fig. 7

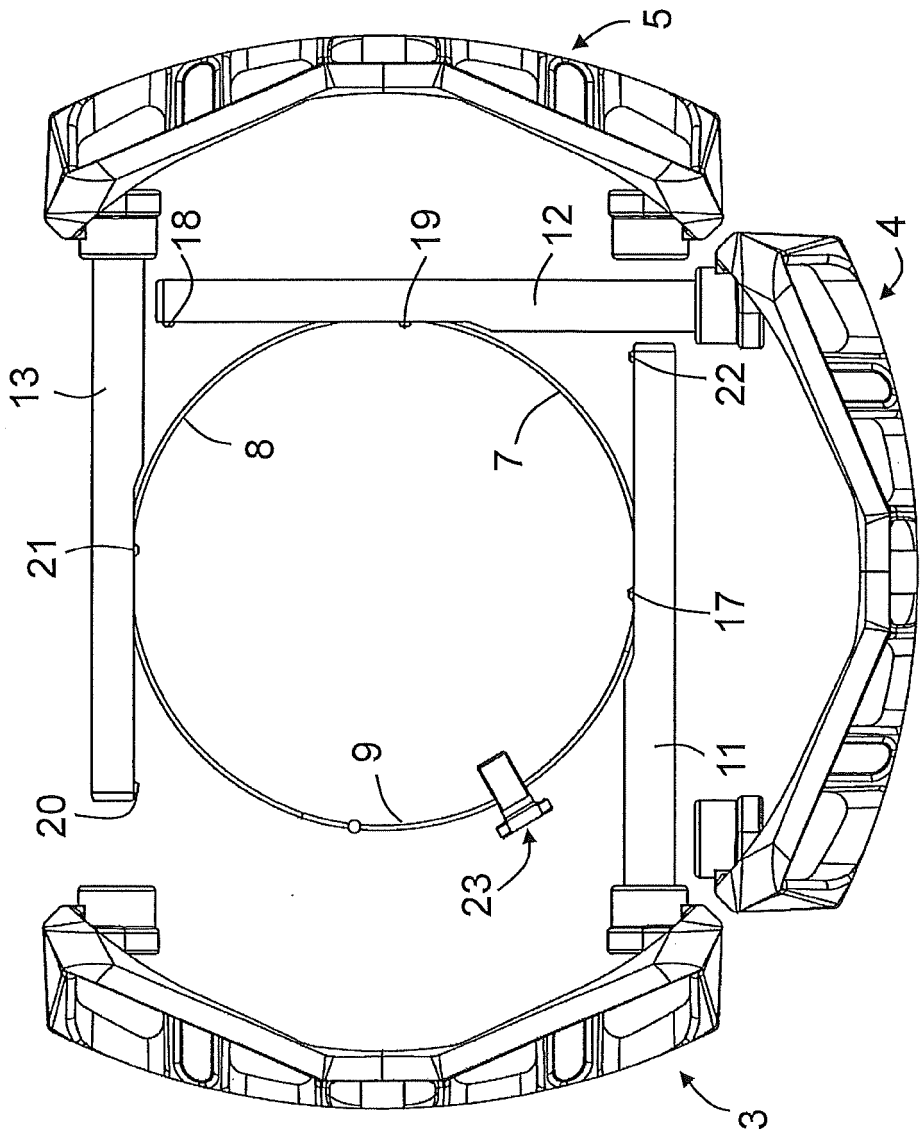


Fig. 8

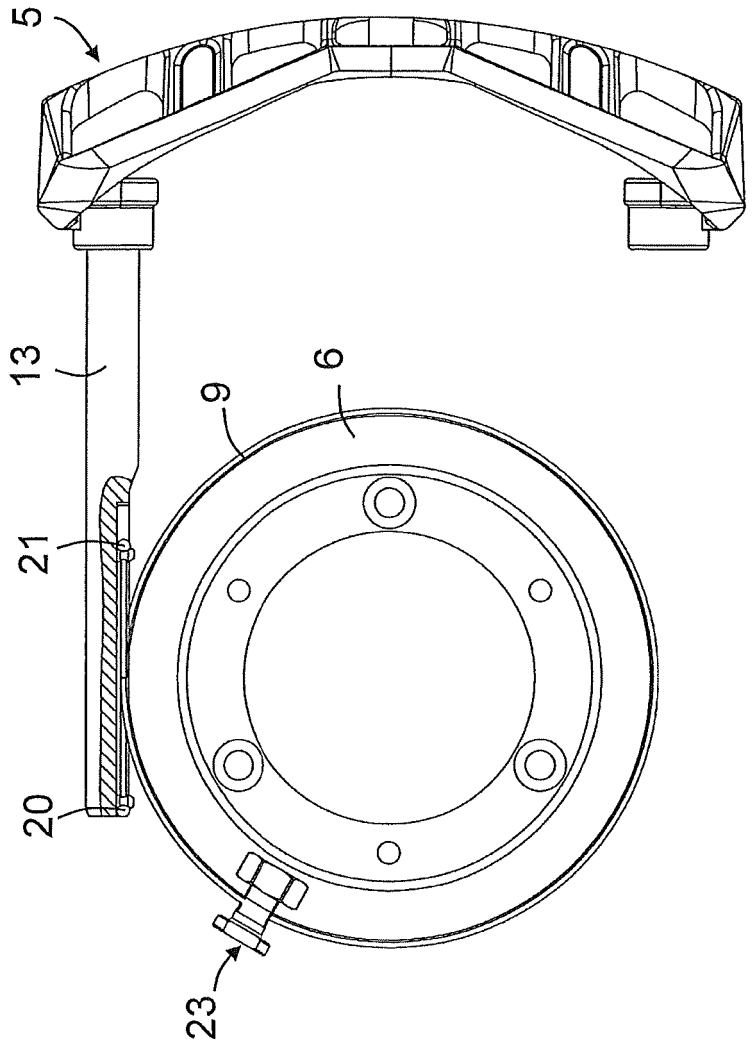


Fig. 9

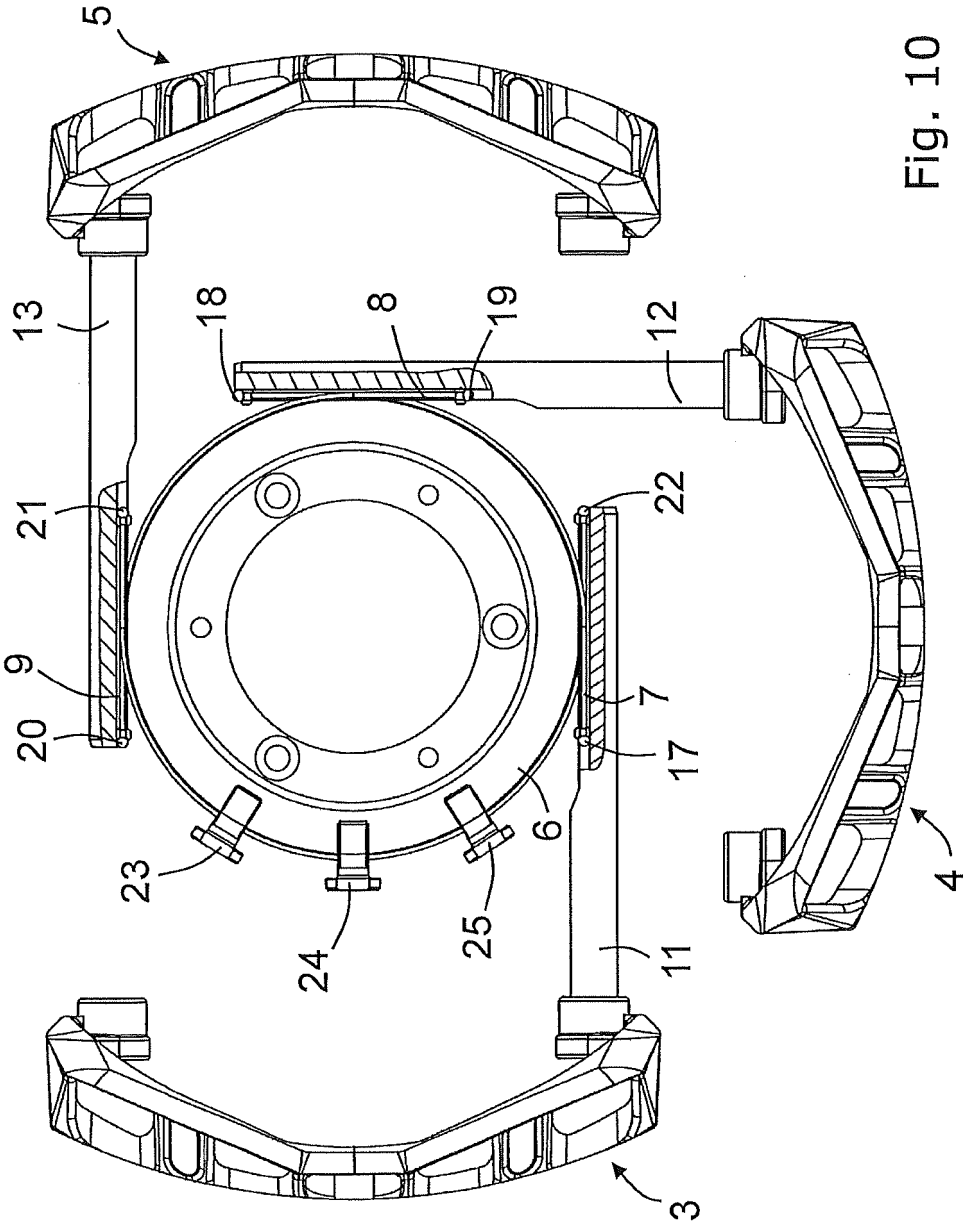


Fig. 10

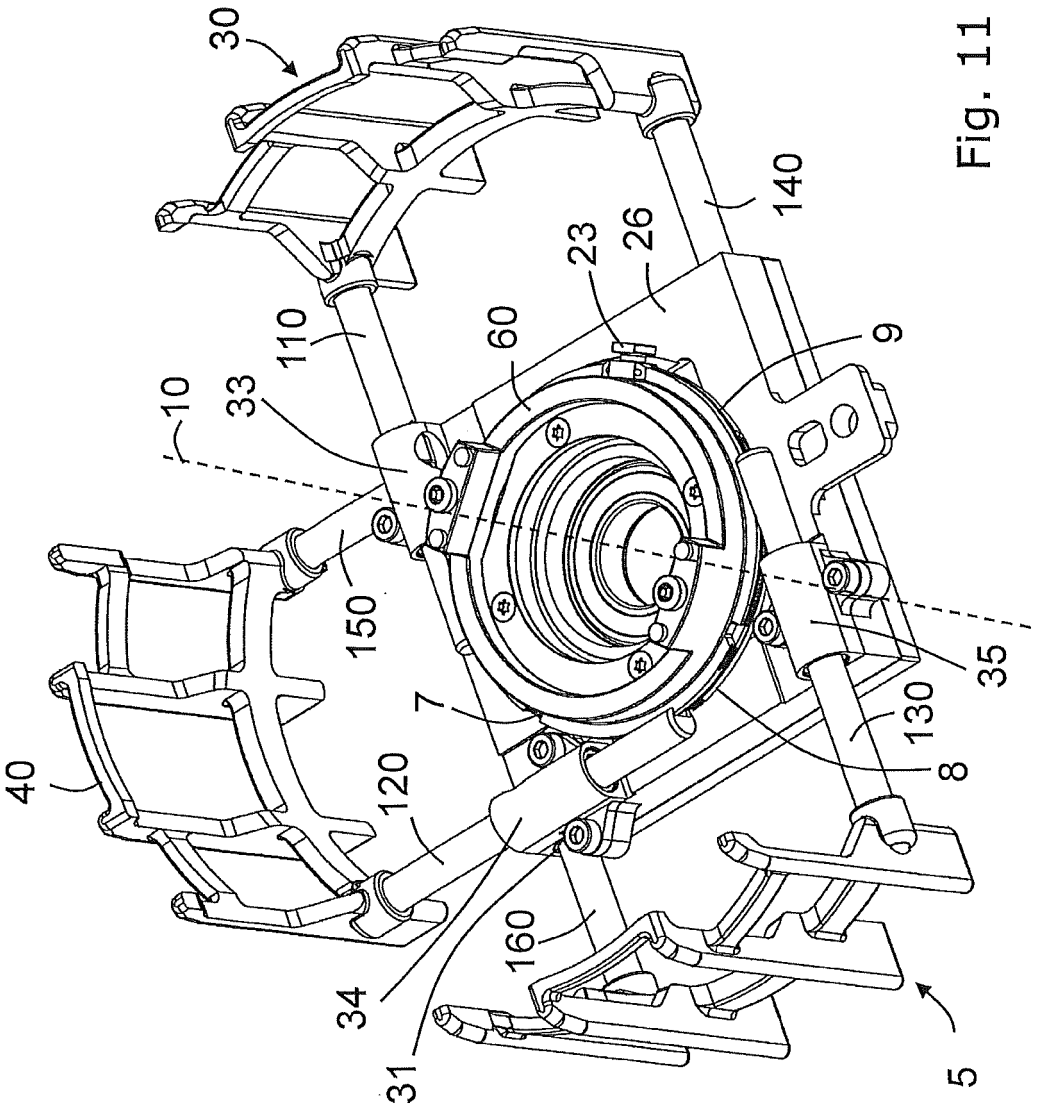
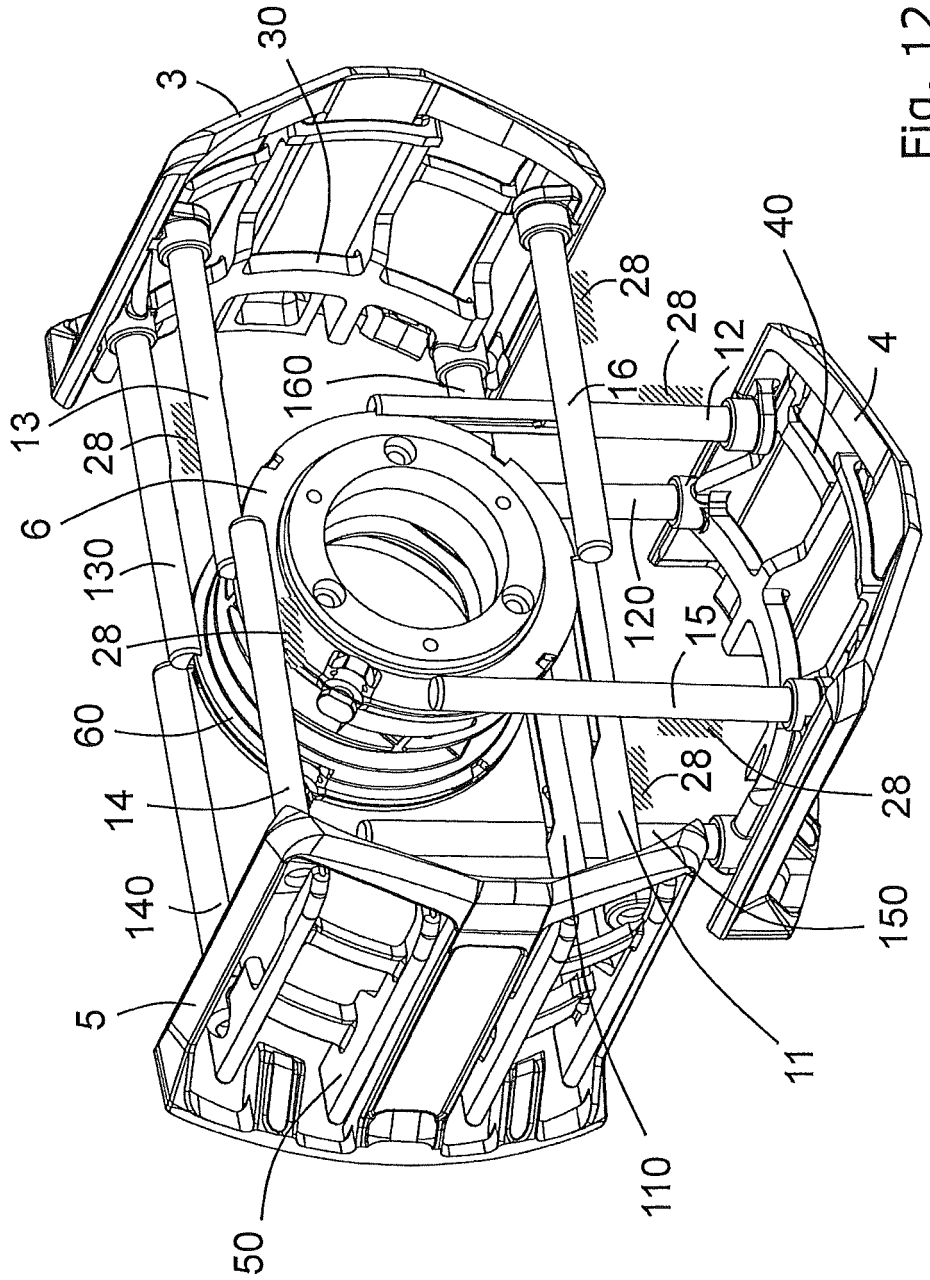


Fig. 11


30
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150
11
110

Fig. 12

REFERENCES CITED IN THE DESCRIPTION

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