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(54) **FABRIC TAKE-UP DEVICE**

(57) The invention relates to a fabric take-up device comprising a take-up roller (2), a pressure roller (3), a rod (4) inserted in the pressure roller (3), and a lever (5), wherein the rod (4) has a first end (41) protruding from the pressure roller (3), a second end (42), and an elongated part (43) that elongates between the first end (41) and the second end (42), and wherein at the first end (41), the rod (4) is mounted using the lever (5), wherein the lever (5) forces the rod (4) towards the take-up roller (2), wherein at the first end (41), the rod (4) is provided with a cut-out (6) extending transversely to a longitudinal direction (40) of the rod (4) for forming a top abutment surface (62), wherein a bottom contact surface (51) of the lever (5) contacts the rod (4) at the top abutment surface (62) for forcing the rod (4) towards the take-up roller (2), and wherein the top abutment surface (62) is configured to interact with the bottom contact surface (51) of the lever (5) for preventing a rotational movement of the rod (4) about an axis extending in the longitudinal direction (40) of the rod (4). The invention further relates to a method for mounting a rod (4) in a fabric take-up device (1).

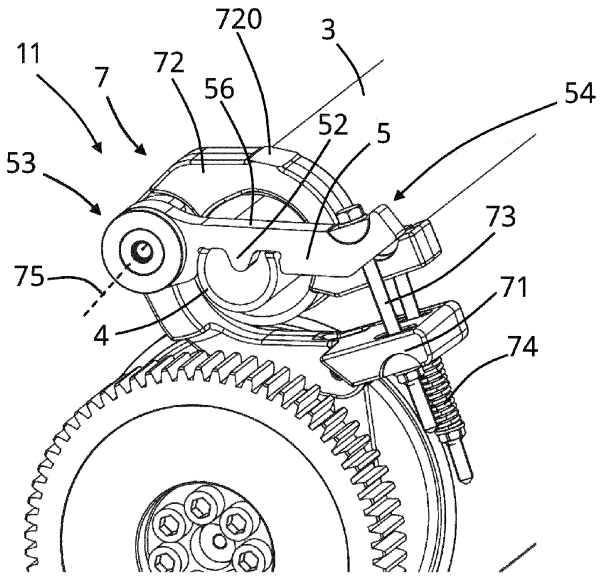

Fig. 2

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Description

TECHNICAL FIELD AND PRIOR ART

[0001] The invention relates to a fabric take-up device comprising a take-up roller, a pressure roller, and a rod inserted in the pressure roller. The invention further relates to a method for mounting a rod in a fabric take-up device.

[0002] As generally known, a fabric take-up device of a weaving machine comprises a take-up roller and one or more pressure rollers, wherein a woven fabric is conveyed between the take-up roller and the pressure roller away from a beat-up line. The pressure roller is supported at its ends and pressed onto the take-up roller. When supporting the pressure roller only at its ends, a pressure applied to the fabric is larger at side ends of the fabric than in the middle of the fabric. Therefore, for forcing the pressure roller towards the take-up roller with a uniform force distribution along the entire length of the pressure roller, it is known to provide a rod, which is inserted in the pressure roller such that opposite first and second side ends protrude from the pressure roller, wherein one or two bearings are arranged between the rod and the pressure roller inside the pressure roller. For mounting the rod, it is known from EP 0 107 798 A1 to provide a lever for receiving the rod, wherein the rod is secured to the lever using a pin. The lever is attached for a swivel movement at one end, and the opposite end is subjected to the action of a locking setscrew for forcing the rod towards the take-up roller.

SUMMARY OF THE INVENTION

[0003] It is the object of the invention to provide a fabric take-up device comprising a take-up roller, a pressure roller, and a rod inserted in the pressure roller, allowing a reliable mounting of the rod. It is a further object of the invention to provide a method for mounting a rod in a fabric take-up device.

[0004] These objects are solved by a fabric take-up device with the features of claim 1 and a method with the features of claim 15. Preferred embodiments are defined in the dependent claims.

[0005] According to a first aspect, a fabric take-up device comprising a take-up roller, a pressure roller, a rod inserted in the pressure roller, and a lever is provided, wherein the rod has a first end protruding from the pressure roller, a second end, and an elongated part that elongates between the first end and the second end, wherein at the first end, the rod is mounted using the lever, wherein the lever forces the rod towards the take-up roller, wherein at the first end, the rod is provided with a cut-out extending transversely to a longitudinal direction of the rod for forming a top abutment surface, wherein a bottom contact surface of the lever contacts the rod at the top abutment surface for forcing the rod towards the take-up roller, and wherein the top abutment surface is configured to interact with the bottom surface of the lever for preventing a rotational movement of the rod about an axis extending in the longitudinal direction of the rod.

[0006] Throughout this application and the following claims, the indefinite article "a" or "an" means "one or more". In particular, the fabric take-up device in embodiments comprises more than one pressure roller and/or more than one lever for mounting one rod.

[0007] In addition, throughout this application and the following claims, the expressions "first" and "second" are only used to distinguish one element from another element and not to indicate any order of the elements.

[0008] According to the invention, a cut-out forming a top abutment surface is formed in the rod, wherein the lever contacts the top abutment surface with its bottom contact surface. The top abutment surface is formed and arranged such that when bringing the lever into contact with the top abutment surface, the interaction between the top abutment surface of the rod and the bottom surface of the lever allows preventing a rotational movement of the rod about an axis extending in the longitudinal direction of the rod, in other words, a rotational movement of the rod inside the pressure roller is prevented. In the context of the application, the expression "prevented" is used to describe that a rotational movement is limited to a tolerable extend. The rod in embodiments is a straight rod. In other embodiments, the rod is buckled or curved. In embodiments, the rod has a circular cross-section. However, the invention is not limited to the use of a rod having a circular cross-section as long as a rotation of the pressure roller is not hindered by the rod inserted in the pressure roller. In embodiments, one, two or more inner bearings are arranged between the rod and the pressure roller.

[0009] In embodiments, the first end and the second end of the rod are both provided with a cut-out for forming abutment surfaces at both the first end and the second end. In other embodiments, a mounting structure used for mounting a second end of the rod differs from a mounting structure used at the first end. As described above, the expressions "first" and "second" are only used to distinguish one element from another element and not to indicate any order of the elements. Further, depending on the boundary conditions, the "first end" is the left end or the right end of the rod when looking at the take-up device from a front of the weaving machine.

[0010] In an embodiment, the cut-out extends across a width of the rod. When providing a cut-out that extends across the width of the rod, a top abutment surface is formed that has two abutment areas, which are distributed along a circumference of the rod. This allows to counter torques acting on the rod in either direction, thereby securely preventing a rotation of the rod inside the pressure roller. Sizes of the two abutment areas depends inter alia on a depth of the cut-out, a length of the cut-out in the longitudinal direction of the rod, and a size of the rod. In embodiments, the rod is a massive rod, wherein the two abutment areas merge seamlessly. In

other embodiments, the rod is a hollow rod, also referred as tube, wherein the two abutment areas are distinct from one another. In this case, the size of the abutment areas further depends on a wall thickness of the rod. A depth of the cut-out in embodiments is for example chosen between about 25% to 75% of an outer radius of the rod, in particular between about 25% to 50% of an outer radius of the rod. The rod can be made of metal, such as steel, fibre reinforced synthetic material, carbon material or any suitable material.

[0011] In embodiments, the cut-out has a V-shaped cut surface. For a simple manufacturing, in other embodiments, the cut-out has a straight or stepped bottom cut surface.

[0012] In an embodiment, an axial abutment surface is formed at the cut-out, which axial abutment surface is configured to interact with a side contact surface of the lever for limiting a movement of the rod along the longitudinal direction. Depending on the design of the cut-out, exactly one or two opposing axial abutment surfaces can be formed for limiting a movement in one or both directions. Further, depending on a position and/or a length of the cut-out in the longitudinal direction of the rod, in an initial mounting position, the side contact surface of the lever contacts the axial abutment surface preventing a movement or is arranged at a distance, thus allowing for a limited movement.

[0013] In embodiments, the axial abutment surface is a stepped or planar surface oriented perpendicular to the longitudinal direction of the rod.

[0014] In embodiments, the axial abutment surface and the top abutment surface are both stepped surfaces or planar surfaces, which stepped surfaces or planar surfaces are oriented perpendicular to one another. In other words, a cut-out having a straight or stepped bottom cut surface and at least one straight or stepped side cut surface is provided.

[0015] In embodiments, the cut-out is groove-shaped having two opposite side cut surfaces. In other embodiments, the cut-out extends to an end face at the first end of the rod. Hence, an open cut-out having only one side cut surface is provided. In embodiments, the rod is provided at both the first end and the second end with a cut-out extending to a respective end face, wherein the fabric take-up device comprises two levers arranged at opposite ends, wherein a first lever has a first side contact surface contacting the side cut surface at the first end and a second lever has a second side contact surface contacting the side cut surface at the second end, thereby limiting a movement of the rod in either direction.

[0016] As mentioned above, in embodiments the rod is a hollow rod. In embodiments, at the bottom contact surface of the lever a protrusion is provided, wherein when the bottom contact surface contacts the top abutment surface the protrusion protrudes into the rod. The protrusion serves as a guide for a correct positioning of the rod and the lever upon mounting the rod.

[0017] In an embodiment, the pressure roller is mounted to the lever using a bearing.

[0018] In other embodiments, the fabric take-up device further comprises a holder, wherein the pressure roller is mounted via an outer bearing in the holder.

[0019] In embodiments, the outer bearing has a semi-circular form with two side ends, wherein preferably the semi-circular form turns into substantial straight lines at the two side ends, wherein the outer bearing supports the pressure roller at its side ends. The design of the outer bearing allows the outer bearing to adapt itself to a diameter of the pressure roller, which alters due to tolerances or wear.

[0020] In embodiments, the outer bearing is provided with a border for limiting an axial movement of the pressure roller.

[0021] In embodiments, the holder is further used for supporting the lever, wherein in an embodiment, a first end of the lever is swivellably mounted to the holder. The lever is swivellable between an open and a closed position for mounting or dismounting the rod.

[0022] In embodiments, the holder comprises a stationary arm and a swivel arm, wherein the outer bearing is arranged at the swivel arm, and wherein the swivel arm is forced towards the stationary arm using a force element, in particular a spring. In other words, the pressure roller and the rod are separately supported. The rod is supported in the pressure roller, preferably via one or more inner bearings, and forced against the take-up roller using the lever. The pressure roller contacts the take-up roller and is supported at an opposing side via the outer bearing in the swivel arm, which swivel arm is forced against the stationary arm for forcing the pressure roller towards the take-up roller.

[0023] In embodiments, the swivel arm of the holder and the lever have a common swivel axis.

[0024] As mentioned above, in embodiments a first end of the lever is swivellably mounted to the holder. Further, in embodiments, a second end of the lever is connected to the stationary arm using a tension rod, in particular a threaded tension rod.

[0025] In embodiments, in which the pressure roller and the rod are separately supported using the swivel arm and the lever, a force applied by the rod on the pressure roller is variable by setting of a position of the lever with respect to a position of the swivel arm.

[0026] In embodiments, a sensor device is provided, which sensor device is configured for measuring a distance between a swivel arm reference surface on a top of the swivel arm and the top abutment surface and/or a distance between the swivel arm reference surface on the top of the swivel arm and a lever reference surface on a top of the lever. The sensor device in embodiments is configured for determining a force applied by the rod to the pressure roller based on the measured distance.

[0027] The sensor device in embodiments comprises distinct entities for measuring a distance and for determining the force applied based on the measured distance. In embodiments, an entity for determining the

force applied is integrated in a central control system of a weaving machine. In other embodiments, the sensor device and/or the entity for determining the force applied is/are separate from the central control system.

[0028] In embodiments, the pressure roller is supported by an inner bearing fixed to the rod between the first end and the second end of the rod.

[0029] According to a second aspect, a method for mounting a rod in a fabric take-up device comprising the rod, a take-up roller, a pressure roller, and a lever is provided, wherein the rod has a first end, a second end, and an elongated part that elongates between the first end and the second end, the method comprising inserting the rod in the pressure roller such that the first end protrudes from the pressure roller, and mounting the rod at least at the first end using the lever, wherein the lever is swivelled to force the rod towards the take-up roller, wherein at the first end, the rod has a cut-out extending transversely to a longitudinal direction of the rod for forming a top abutment surface, the method comprising bringing a bottom contact surface of the lever into contact with the rod at the top abutment surface for forcing the rod towards the take-up roller, wherein the top abutment surface interacts with the bottom contact surface of the lever for preventing a rotational movement of the rod about an axis extending in the longitudinal direction of the rod.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] In the following, an embodiment of the invention is described in detail based on several schematic drawings in which:

Fig. 1 shows in a perspective view a fabric take-up device comprising a take-up roller, a pressure roller, a rod inserted in the pressure roller, and an additional second pressure roller;

Fig. 2 shows in a perspective view a mounting and support structure for the rod and the pressure roller of the fabric take-up device of Fig. 1;

Fig. 3 shows in a perspective view the mounting and support structure of Fig. 2 without the lever;

Fig. 4 shows in a perspective view a first end of the rod of the fabric take-up device of Fig. 1;

Fig. 5 shows in a perspective view a lever used for mounting the first end of the rod in the fabric take-up device of Fig. 1;

Fig. 6 shows in a partly sectional view from behind the mounting and support structure of Fig. 2 without a swivel arm and without the pressure roller;

Fig. 7 shows in a partly sectional view from behind the mounting and support structure of Fig. 2;

Fig. 8 shows in a side view the mounting and support structure of Fig. 2;

Fig. 9 shows in a perspective view an outer bearing used for supporting the pressure roller in the mounting and support structure of Fig. 2;

Fig. 10 shows in a view from behind the outer bearing of Fig. 9 together with two lines indicating two diameters of a pressure roller supported by the outer bearing;

Fig. 11 shows in a partly sectional side view the take-up roller, the pressure roller, and the rod inserted in the pressure roller, of the fabric take-up device of Fig. 1 according to a first embodiment;

Fig. 12 shows in a perspective view the rod of the fabric take-up device of Fig. 1 together with two inner bearings;

Fig. 13 shows in an exploded view the rod and the two inner bearings of Fig. 12;

Fig. 14 shows in a partly sectional side view a second embodiment of a fabric take-up device similar to Fig. 11, but using only one inner bearing;

Fig. 15 shows in a perspective view an alternative embodiment of a rod of a fabric take-up device similar to Fig. 1 together with two inner bearings;

Fig. 16 shows in a perspective view another alternative embodiment of a rod of a fabric take-up device similar to Fig. 1 together with two inner bearings; and

Fig. 17 shows in a perspective view a first end of another alternative embodiment of a rod of the fabric take-up device of Fig. 1.

DETAILED DESCRIPTION OF EMBODIMENTS

[0031] Throughout the drawings, the same or similar elements will be denoted by the same reference numerals.

[0032] Fig. 1 shows in a perspective view a fabric take-up device 1 comprising a take-up roller 2, a pressure roller 3, and a rod 4 inserted in the pressure roller 3. The take-up device 1 shown in Fig. 1 comprises two mounting and support structures 11, 12 for mounting the rod 4 and the supporting the pressure roller 3 at opposite ends. In the embodiment shown, the mounting and support structures 11, 12 provided at the opposite ends are structurally

similar and will be described in more detail below with reference to several drawings. In other embodiments, one of the two mounting and support structures 11, 12 differs in design.

[0033] The fabric take-up device 1 shown in Fig. 1 comprises an additional second pressure roller 300, wherein a support structure for the pressure roller 3 and the additional second pressure roller 300 differ in design. In other embodiments, the additional second pressure roller 300 and the pressure roller 3 are supported by support structures that are identical in design.

[0034] The rod 4 has a first end 41 and a second end 42 protruding at opposite sides from the pressure roller 3 and an elongated part 43 (see Fig. 12) that elongates between the first end 41 and the second end 42, which is not visible in Fig. 1. The mounting and support structures 11, 12 shown in Fig. 1 each comprise a lever 5 arranged at the first end 41 and the second end 42, respectively, which levers 5 are used for forcing the rod 4 towards the take-up roller 2.

[0035] The mounting and support structures 11, 12 shown in Fig. 1 further each comprise a holder 7 with a stationary arm 71 and a swivel arm 72. The stationary arm 71 is attached to a weaving machine frame (not shown).

[0036] Figs. 2 to 13 show details and elements of the fabric take-up device 1 of Fig. 1 in enlarged views.

[0037] Fig. 2 shows in an enlarged view the mounting and support structure 11 of Fig. 1 comprising a lever 5. Fig. 3 shows in an enlarged view the mounting and support structure 11 of Fig. 2 without the lever 5. Fig. 4 shows the first end 41 of the rod 4 in isolation. Fig. 5 shows the lever 5 in isolation. Figs. 6 and 7 show the mounting and support structure 11 of Fig. 1 from behind. Fig. 8 shows the mounting and support structure 11 of Fig. 1 in a side view.

[0038] As shown in Figs. 2, 5 and 6, the lever 5 has a first end 53, which is swivellably mounted to the holder 7, more particular to the stationary arm 71 of the holder 7. A second end 54 of the lever 5 is connected to an opposite end of the stationary arm 71 using a tension rod, in the embodiment shown a threaded tension rod 73. The swivel arm 72 (not shown in Fig. 6) is swivellably mounted to the stationary arm 71, wherein in the embodiment shown the swivel arm 72 and the lever 5 have a common swivel axis 75. The take-up roller 2 can be driven by a drive gear 10.

[0039] As shown in Figs. 3 and 4, at the first end 41, the rod 4 is provided with a cut-out 6 extending transversely to a longitudinal direction 40 of the rod 4 for forming a top abutment surface 62 and an axial abutment surface 61. In the embodiment shown, the axial abutment surface 61 and the top abutment surface 62 are both planar surfaces oriented perpendicular to one another.

[0040] In the embodiment shown, the cut-out 6 extends across a width of the rod 4 and has a straight bottom cut surface. The rod 4 is a hollow rod so that the top abutment surface 62 has two distinct abutment areas 621, 622 that form a straight bottom cut surface, which are distributed along a circumference of the rod 4 and arranged in a common plane and facing in the same direction.

[0041] As shown in Fig. 2, 5 and 6, a bottom contact surface 51 of the lever 5 contacts the rod 4 at the top abutment surface 62 for forcing the rod 4 towards the take-up roller 2. The two abutment areas 621, 622 of the top abutment surface 62 interact with the bottom contact surface 51 of the lever 5 for countering torques acting on the rod 4, thereby preventing a rotational movement of the rod 4 about an axis extending in the longitudinal direction 40 of the rod 4. For example, the rod 4 is arranged with play between two surfaces 57, 58 of the lever 5, in other words in use the rod 4 can contact one of the surfaces 57 or 58.

[0042] In the embodiment shown, a protrusion 52 is provided at the bottom contact surface 51 of the lever 5, wherein when the bottom contact surface 51 contacts the top abutment surface 62 as shown in Fig. 2, the protrusion 52 protrudes into the rod 4.

[0043] In the embodiment shown in Figs. 1 to 13, the cut-out 6 extends to an end face 44 (see Fig. 4) at the first end 41 of the rod 4. Hence, exactly one axial abutment surface 61 is formed at the cut-out 6, which axial abutment surface 61 is a planar surface oriented perpendicular to the longitudinal direction 40 of the rod 4.

[0044] The axial abutment surface 61 interacts with a side contact surface 55 of the lever 5 for limiting a movement of the rod 4 along the longitudinal direction 40, wherein in the embodiment shown, the axial abutment surface 61 only limits a movement towards the left in the drawing plane of Figs. 1 to 3.

[0045] As shown in Fig. 7, the pressure roller 3 is mounted via an outer bearing 8 in the holder 7, more particular in the swivel arm 72 of the holder 7. Fig. 9 shows the outer bearing 8 in isolation. In the embodiment shown, the outer bearing 8 has a semi-circular form with two side ends 80, which semi-circular form is turning into substantial straight lines near the two side ends 80. In the embodiment shown, the outer bearing 8 is further provided with a border 81 for limiting an axial movement of the pressure roller 3.

[0046] The outer bearing 8 supports the pressure roller 3 at its side ends 80.

[0047] Fig. 10 shows in a view from behind the outer bearing 8 together with two lines indicating two diameters of a pressure roller 3 supported by the outer bearing 8, wherein the solid line illustrates a pressure roller 3 of a larger diameter and the broken line illustrates a pressure roller 3 of a smaller diameter, wherein the diameter for example can alter due to tolerances or wear, for example when a coating on the pressure roller 3 is worn. The outer bearing 8 supports the pressure roller 3 at its side ends 80 regardless of the variation of the diameter without play, in particular near the substantially straight lines 84 of the outer bearing 8.

[0048] As shown in Figs. 2, 3, 7, and 8, the swivel arm 72 is forced towards the stationary arm 71 using a force

element, in particular a spring 74, thereby forcing the pressure roller 3 against the take-up roller 2.

[0049] As shown in Figs. 11 to 13, according to the first embodiment, the pressure roller 3 is further supported and forced against the take-up roller 2 by two inner bearings 9 arranged on the elongated part 43 of the rod 4 between the first end 41 and the second end 42 of the rod 4, which inner bearings 9 act on the inner surface of the pressure roller 3. As shown in Figs. 12 and 13, the inner bearings 9 are mounted to the rod 4 fixed in position using positioning pins 91. The inner bearings 9 shown in Figs. 12 and 13 are ring-shaped plain or slide bearings. In alternative (not shown), the inner bearings 9 can be another kind of bearing, such as cylinder bearings or roller bearings.

[0050] The lever 5 and the swivel arm 72 allow a position of the rod 4 with respect to the take-up roller 2 to be set by means of the lever 5 independently of the position of the pressure roller 3 with respect to the rod 4 by means of the swivel arm 72. Hence, a force applied by the rod 4 on the pressure roller 3 is variable by setting a position of the lever 5 with respect to a position of the swivel arm 72.

[0051] As schematically shown in Fig. 8, in the embodiment shown a sensor device 100 is provided, which sensor device 100 is configured for measuring a distance D between a swivel arm reference surface 720 on a top of the swivel arm 72 and a lever reference surface 56 on a top of the lever 5. The sensor device 100 is further configured for determining a force applied by the rod 4 to the pressure roller 3 based on the measured distance D.

[0052] According to the embodiment of Fig. 14, the pressure roller 3 is further supported and forced against the take-up roller 2 by one inner bearing 9 arranged on the rod 4 between the first end 41 and the second end 42 of the rod 4.

[0053] In the alternative embodiment of Fig. 15, only the first end 41 of the rod 4 is provided with a cut-out 6 extending transversely to a longitudinal direction of the rod 4.

[0054] In the alternative embodiment of Fig. 16, the cut-out 6 is groove-shaped having two opposite side cut surfaces forming two opposing axial abutment surfaces 60, 61 for limiting a movement of the rod 4 in both directions.

[0055] In the alternative embodiment of Fig. 17, the axial abutment surface 62 is a stepped surface oriented perpendicular to the longitudinal direction of the rod 4 and having distinct abutment areas 621, 622 that form a stepped bottom cut surface.

[0056] In an alternative embodiment (not shown), the holder 7 with a stationary arm 71 and a swivel arm 72 for the outer bearing 8 can be replaced by a holder that is provided with a cylinder bearing or a roller bearing. Hereby, for example, the inner ring of the bearing can cooperate with the outer surface of the pressure roller 3, while the outer ring of the bearing is mounted to the holder. Of course, other kinds of bearings are conceivable for bearing the pressure roller 3.

Claims

1. Fabric take-up device comprising a take-up roller (2), a pressure roller (3), a rod (4) inserted in the pressure roller (3), and a lever (5), wherein the rod (4) has a first end (41) protruding from the pressure roller (3), a second end (42), and an elongated part (43) that elongates between the first end (41) and the second end (42), and wherein at the first end (41), the rod (4) is mounted using the lever (5), wherein the lever (5) forces the rod (4) towards the take-up roller (2), **characterized in that** at the first end (41), the rod (4) is provided with a cut-out (6) extending transversely to a longitudinal direction (40) of the rod (4) for forming a top abutment surface (62), wherein a bottom contact surface (51) of the lever (5) contacts the rod (4) at the top abutment surface (62) for forcing the rod (4) towards the take-up roller (2), and wherein the top abutment surface (62) is configured to interact with the bottom contact surface (51) of the lever (5) for preventing a rotational movement of the rod (4) about an axis extending in the longitudinal direction (40) of the rod (4).

2. The fabric take-up device according to claim 1, **characterized in that** the cut-out (6) extends across a width of the rod (4).

3. The fabric take-up device according to claim 1 or 2, **characterized in that** the cut-out (6) has a straight or stepped bottom cut surface.

4. The fabric take-up device according to claim 1, 2 or 3, **characterized in that** an axial abutment surface (61) is formed at the cut-out (6), which axial abutment surface (61) is configured to interact with a side contact surface (55) of the lever (5) for limiting a movement of the rod (4) along the longitudinal direction (40), wherein in particular the axial abutment surface (61) is a stepped or planar surface oriented perpendicular to the longitudinal direction (40) of the rod (4).

5. The fabric take-up device according to claim 4, **characterized in that** the axial abutment surface (61) and the top abutment surface (62) are both stepped surfaces or planar surfaces oriented perpendicular to one another.

6. The fabric take-up device according to any one of claims 1 to 5, **characterized in that** the cut-out (6) extends to an end face (44) at the first end (41) of the rod (4).

7. The fabric take-up device according to any one of claims 1 to 6, **characterized in that** the rod (4) is a

hollow rod, wherein in particular at the bottom contact surface (51) of the lever (5) a protrusion (52) is provided, wherein when the bottom contact surface (51) contacts the top abutment surface (62) the protrusion (52) protrudes into the rod (4).

8. The fabric take-up device according to any one of claims 1 to 7, **characterized in that** the fabric take-up device (1) further comprises a holder (7), wherein the pressure roller (3) is mounted via an outer bearing (8) in the holder (7), wherein in particular the outer bearing (8) has a semi-circular form with two side ends (80), wherein the outer bearing (8) supports the pressure roller (3) at its side ends (80).

9. The fabric take-up device according to claim 8, **characterized in that** the outer bearing (8) is provided with a border (81) for limiting an axial movement of the pressure roller (3).

10. The fabric take-up device according to claim 8 or 9, **characterized in that** a first end (53) of the lever (5) is swivellably mounted to the holder (7).

11. The fabric take-up device according to any one of claims 8 to 10, **characterized in that** the holder (7) comprises a stationary arm (71) and a swivel arm (72), wherein the outer bearing (8) is arranged at the swivel arm (72), and wherein the swivel arm (72) is forced towards the stationary arm (71) using a force element, in particular a spring (74), wherein in particular the swivel arm (72) of the holder (7) and the lever (5) have a common swivel axis (75).

12. The fabric take-up device according to claim 11, **characterized in that** a second end (54) of the lever (5) is connected to the stationary arm (71) using a tension rod, in particular a threaded tension rod (73).

13. The fabric take-up device according to any one of claims 11 or 12, **characterized in that** a sensor device (100) is provided, which sensor device (100) is configured for measuring a distance between a swivel arm reference surface on a top of the swivel arm (72) and the top abutment surface (62) and/or a distance between the swivel arm reference surface on the top of the swivel arm (72) and a lever reference surface on a top of the lever (5).

14. The fabric take-up device according to any one of claims 1 to 13, **characterized in that** the pressure roller (3) is supported by an inner bearing (9) fixed to the rod (4) between the first end (41) and the second end (42) of the rod (4).

15. Method for mounting a rod (4) in a fabric take-up device (1) comprising the rod (4), a take-up roller (2), a pressure roller (3), and a lever (5), wherein the rod (4) has a first end (41), a second end (42), and an elongated part (43) that elongates between the first end (41) and the second end (42), the method comprising inserting the rod (4) in the pressure roller (3) such that the first end (41) protrudes from the pressure roller (3), and mounting the rod (4) at least at the first end (41) using the lever (5), wherein the lever (5) is swivelled to force the rod (4) towards the take-up roller (2), **characterized in that** at the first end (41), the rod (4) has a cut-out (6) extending transversely to a longitudinal direction (40) of the rod (4) for forming a top abutment surface (62), the method comprising bringing a bottom contact surface (51) of the lever (5) into contact with the rod (4) at the top abutment surface (62) for forcing the rod (4) towards the take-up roller (2), wherein the top abutment surface (62) interacts with the lever (5) for preventing a rotational movement of the rod (4) about an axis extending in the longitudinal direction (40) of the rod (4).

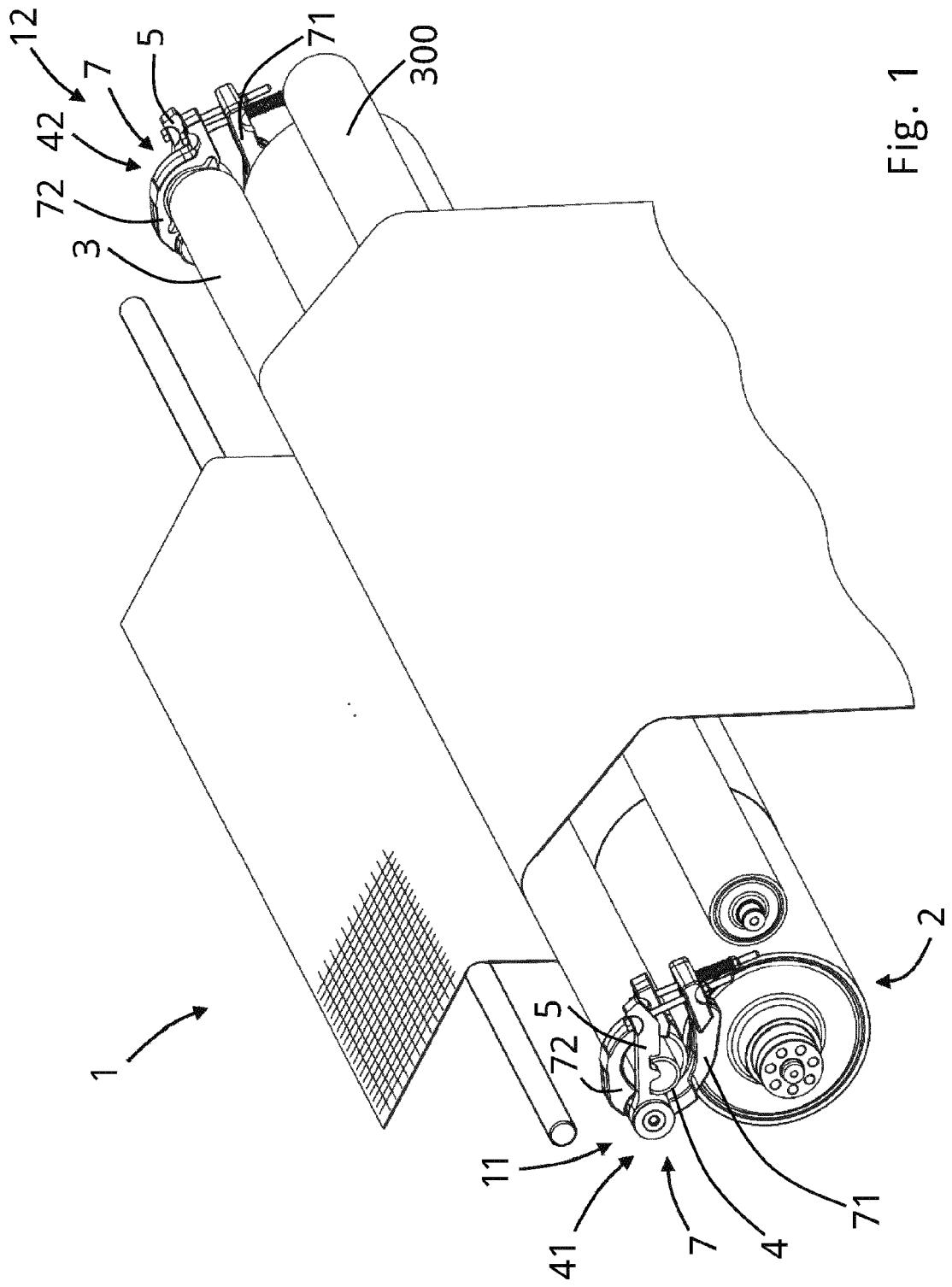

Fig. 1

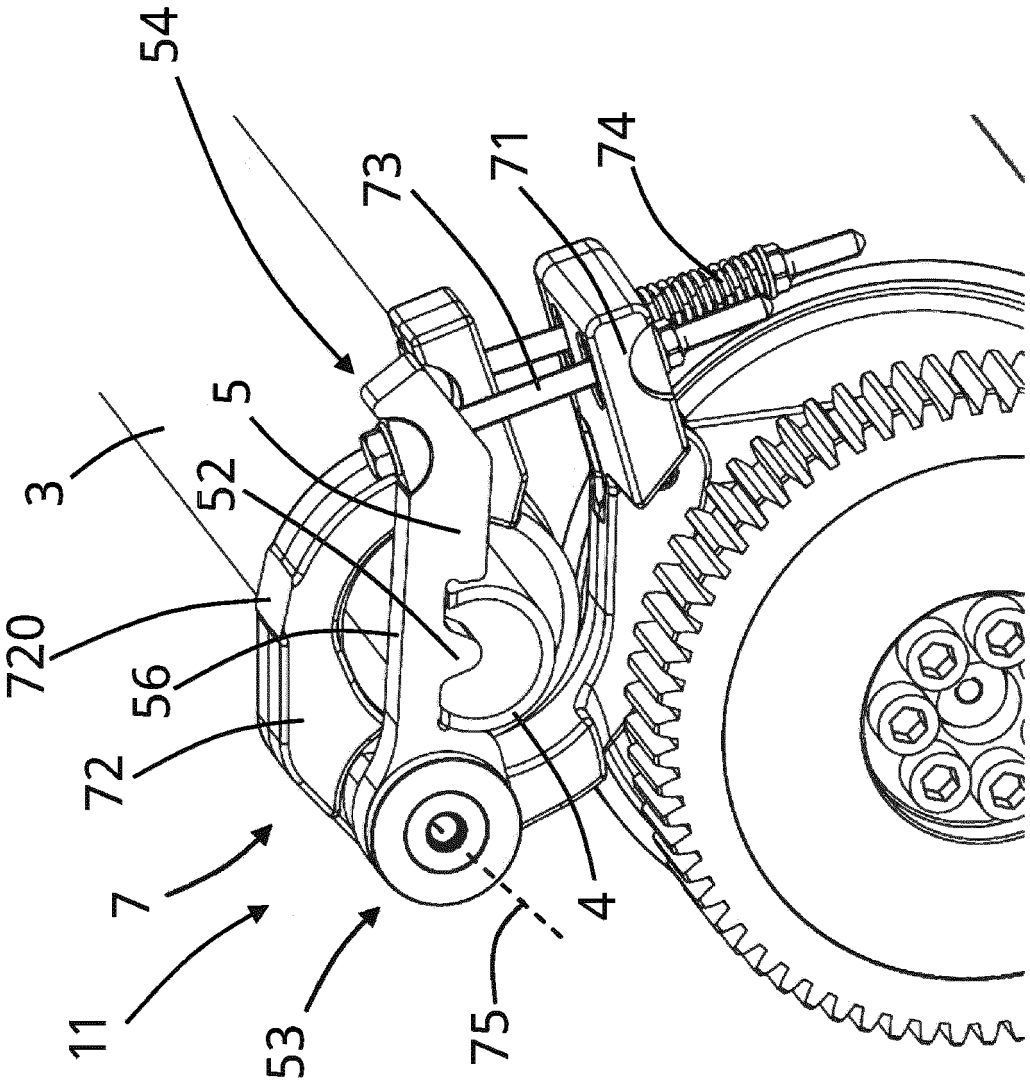

Fig. 2

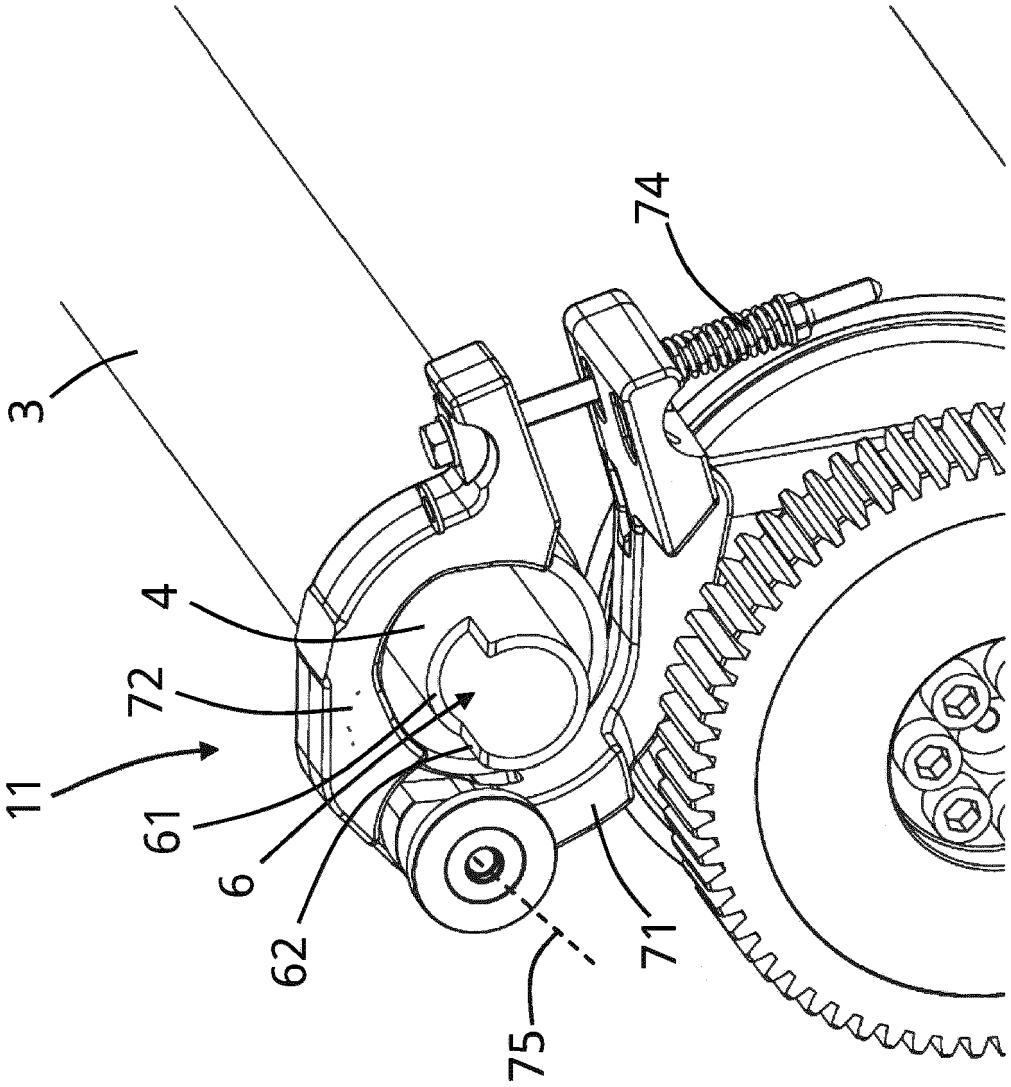

Fig. 3

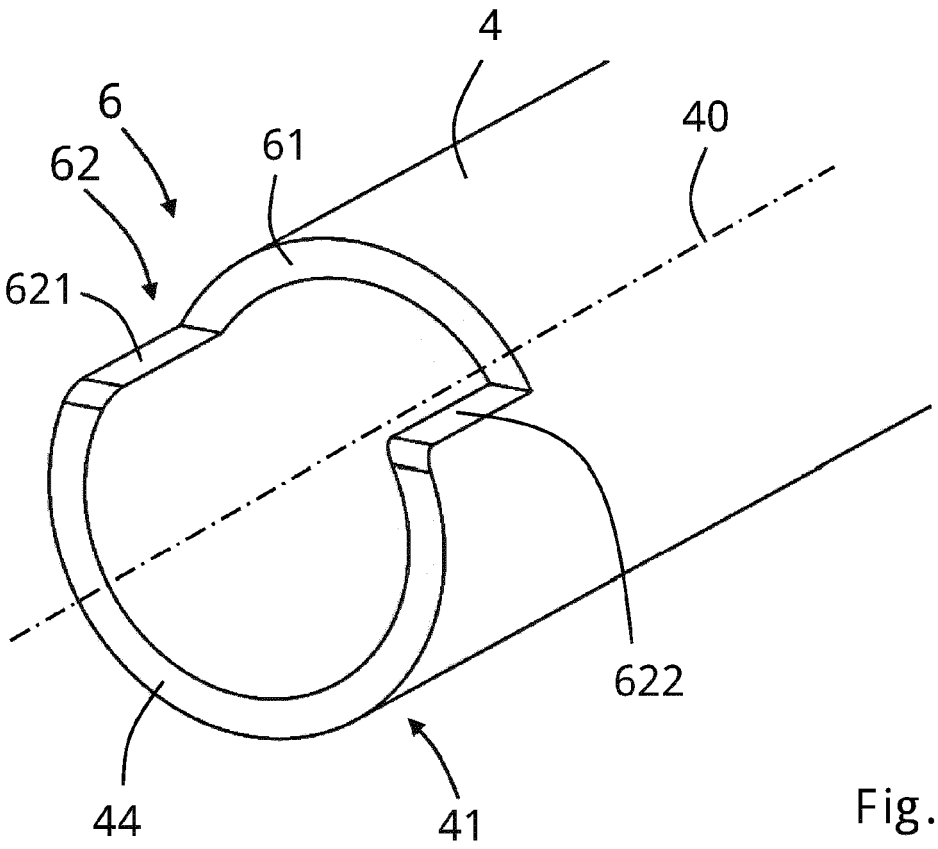

Fig. 4

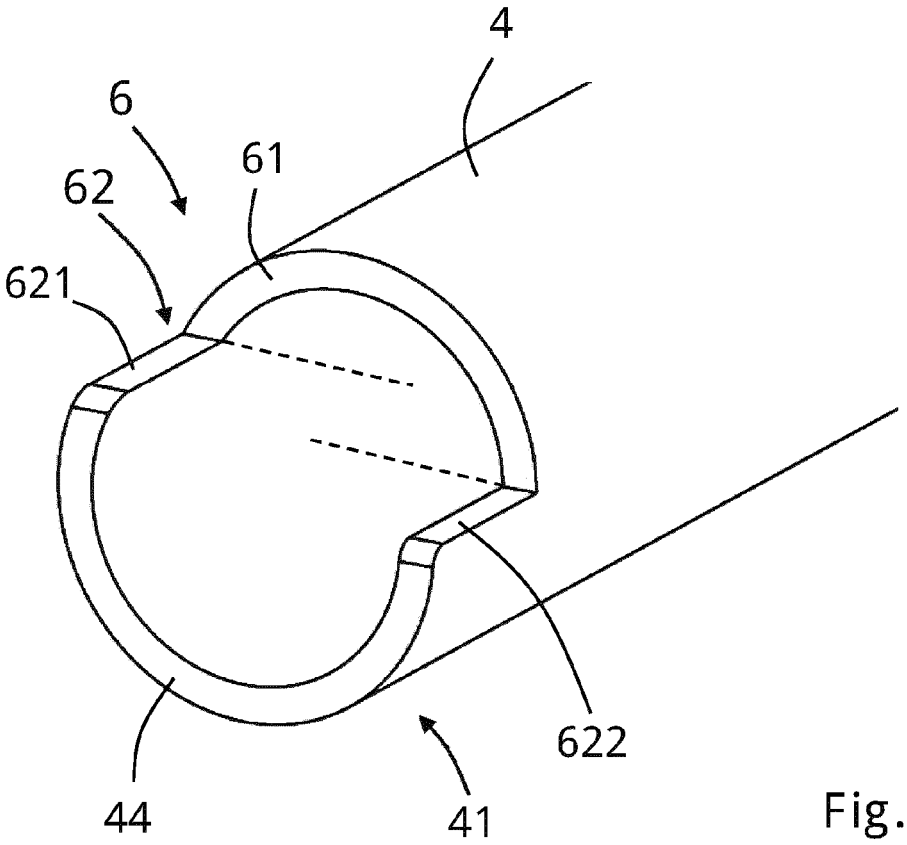

Fig. 17

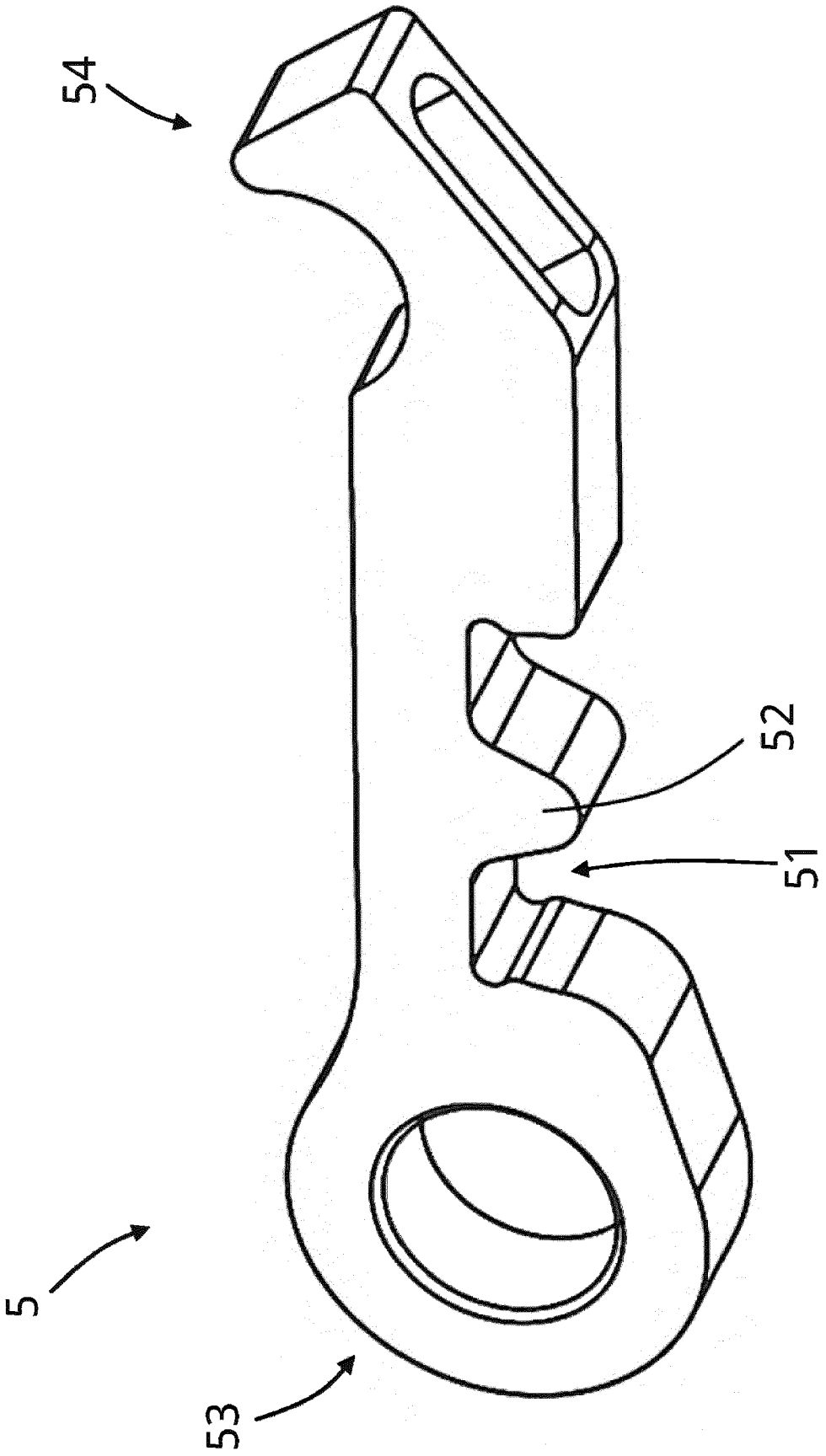

Fig. 5

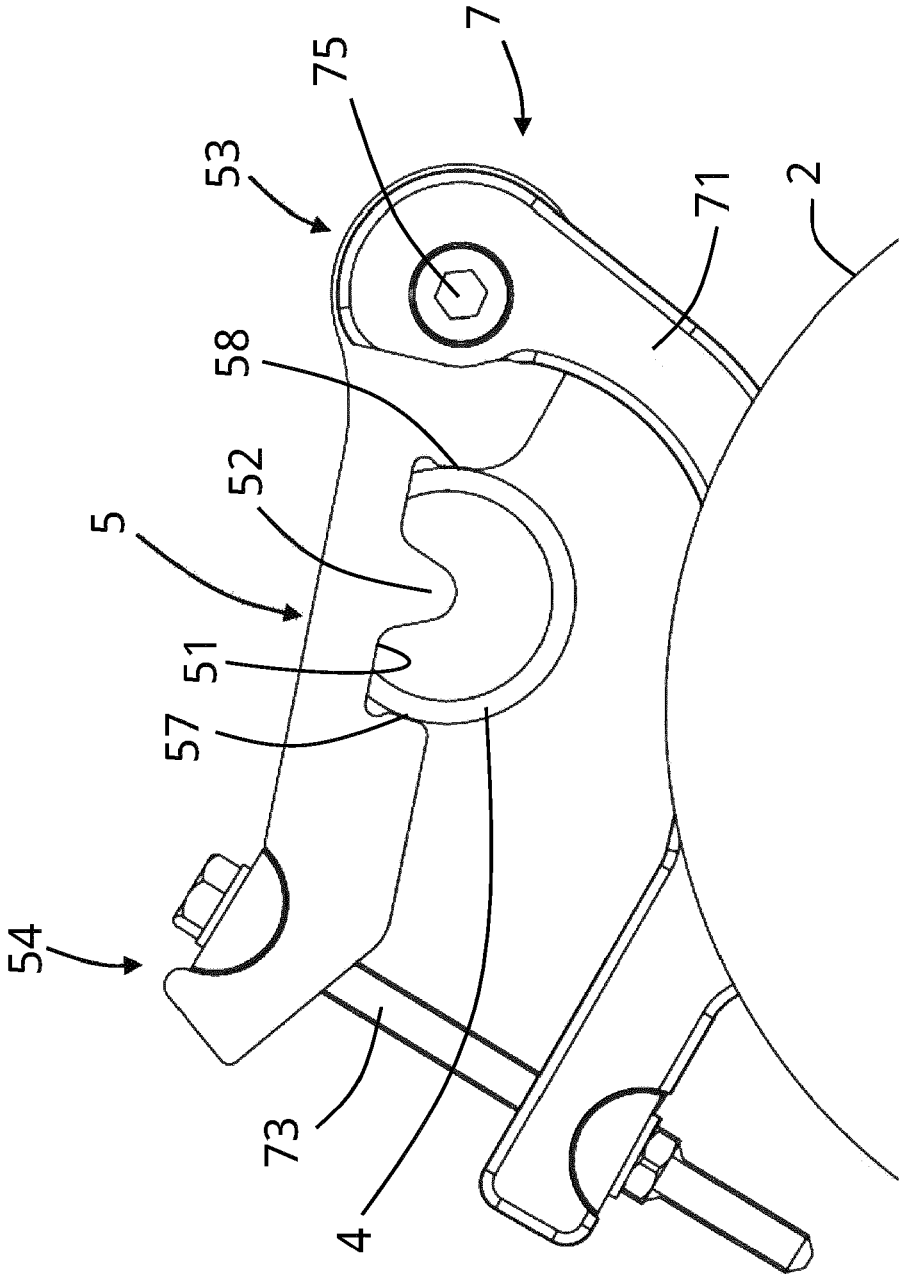

Fig. 6

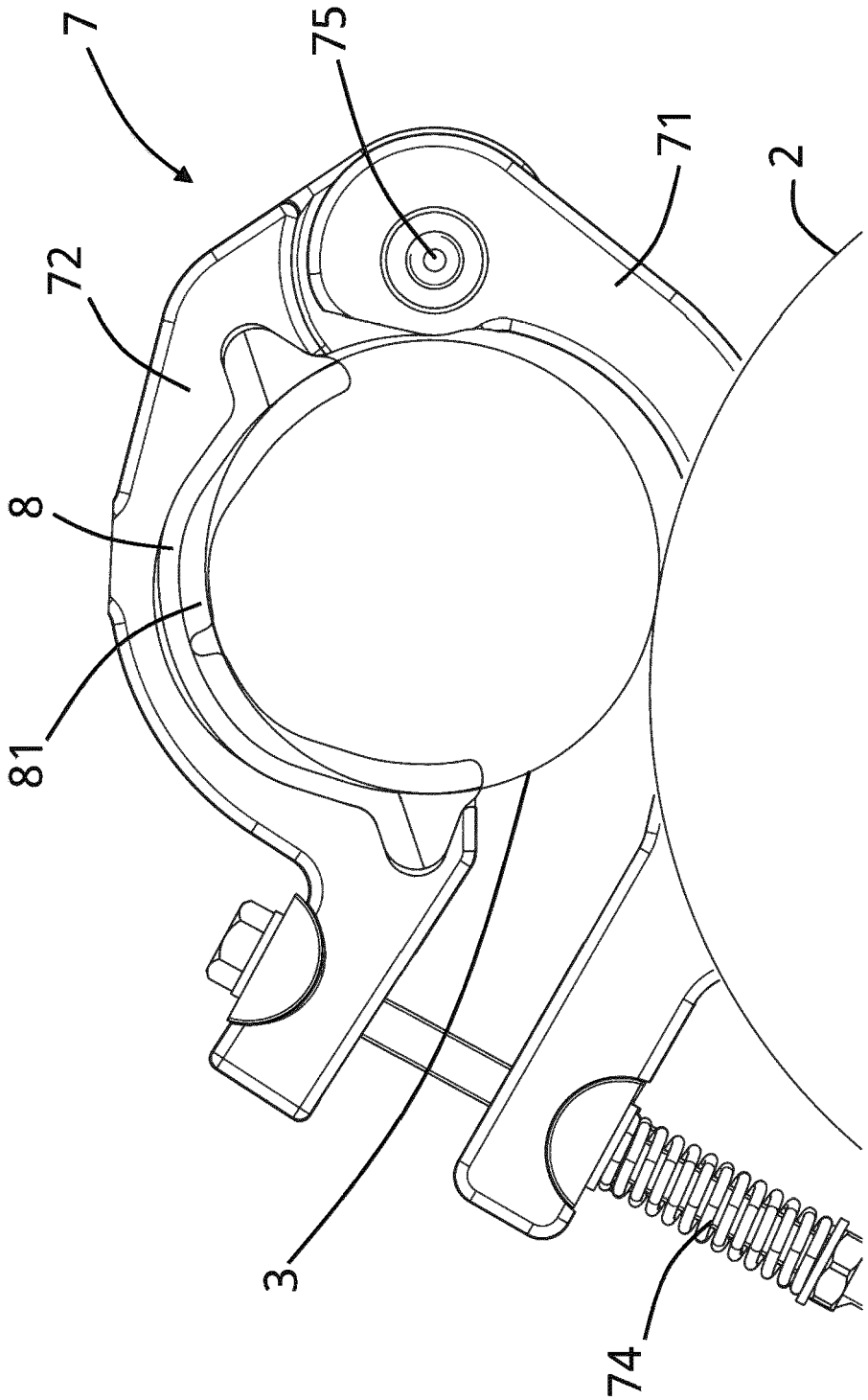

Fig. 7

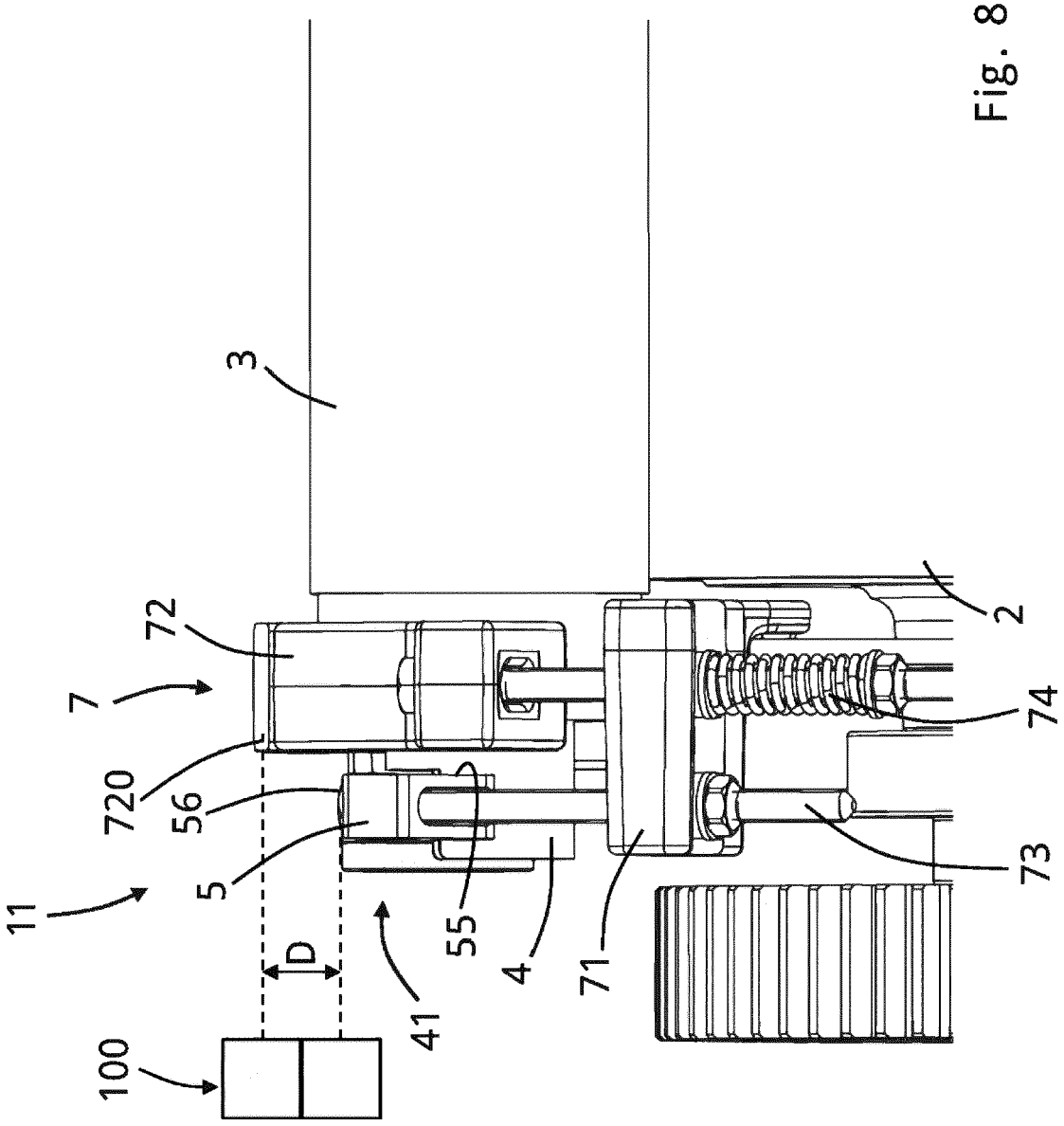

Fig. 8

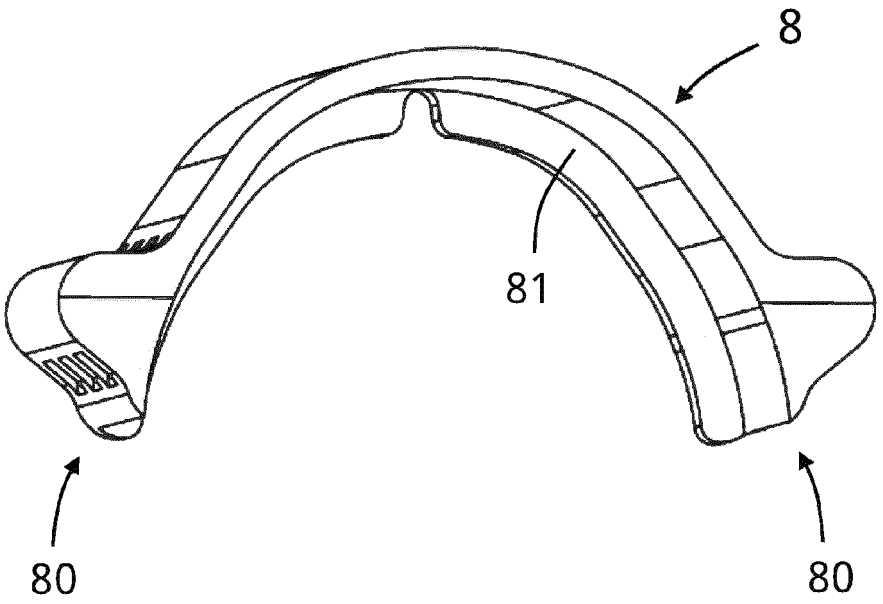

Fig. 9

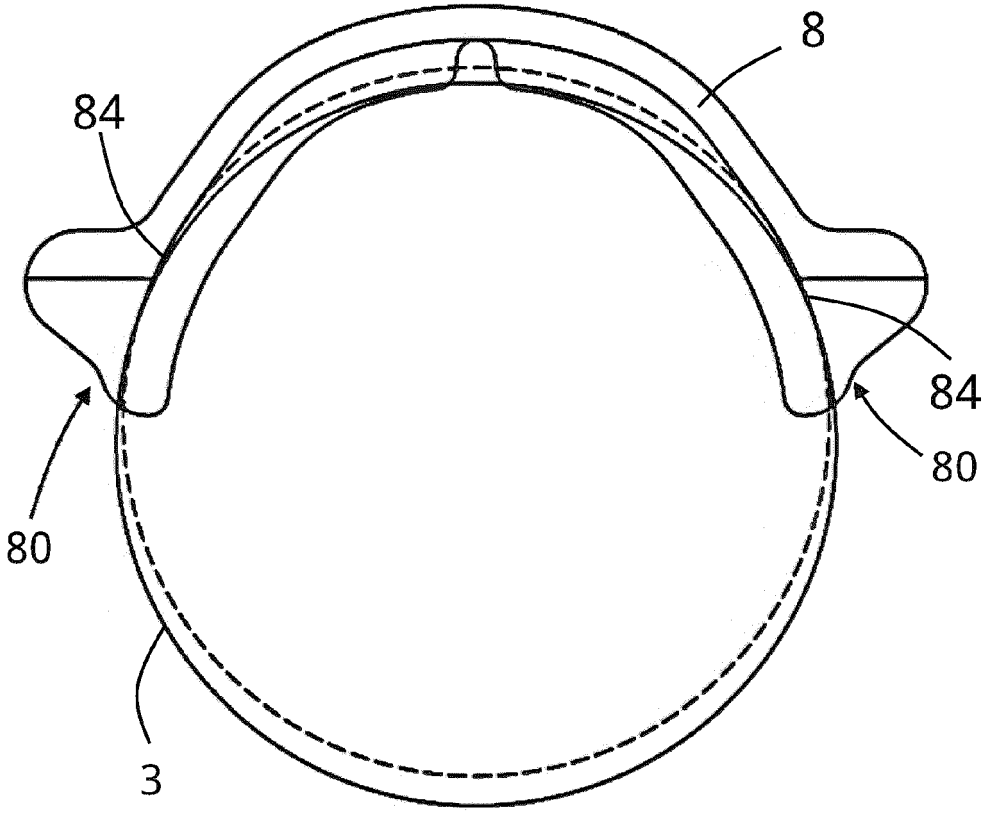

Fig. 10

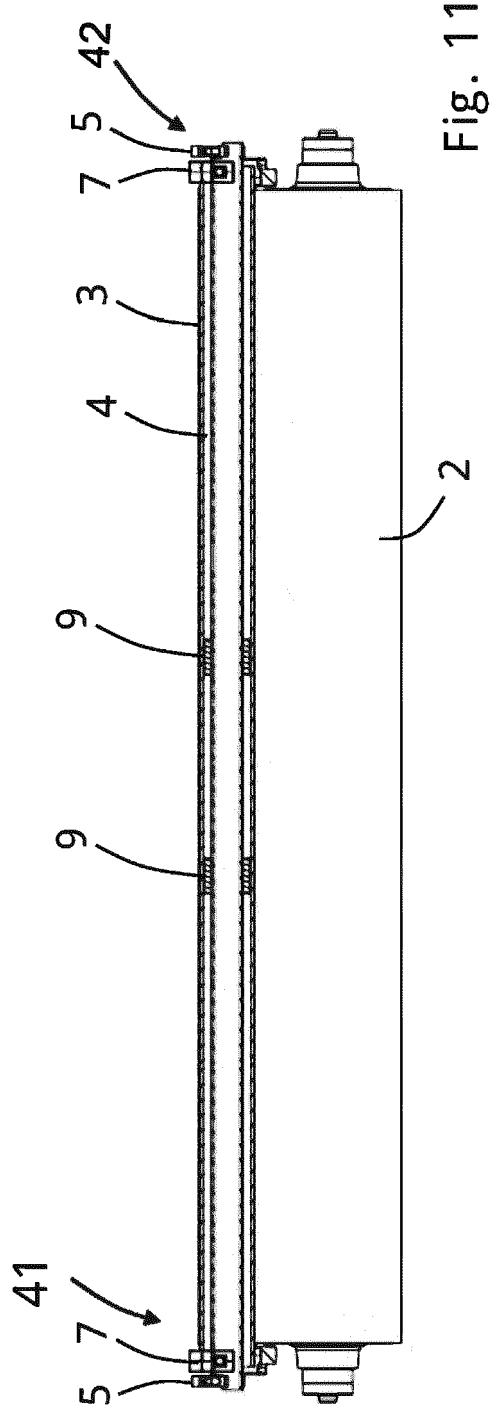

Fig. 11

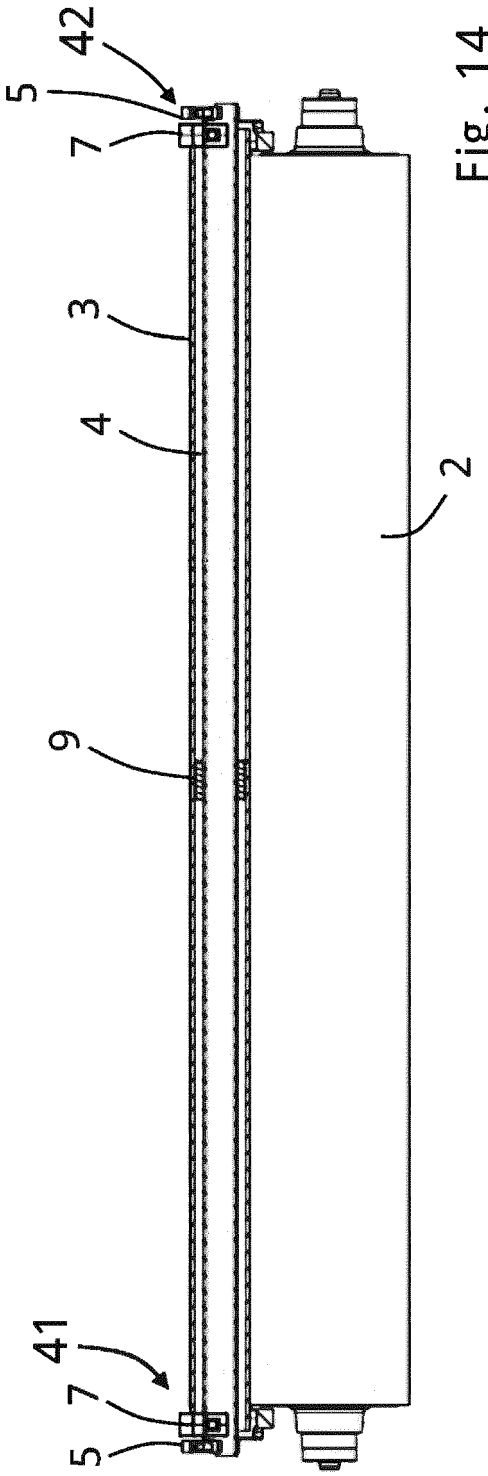

Fig. 14

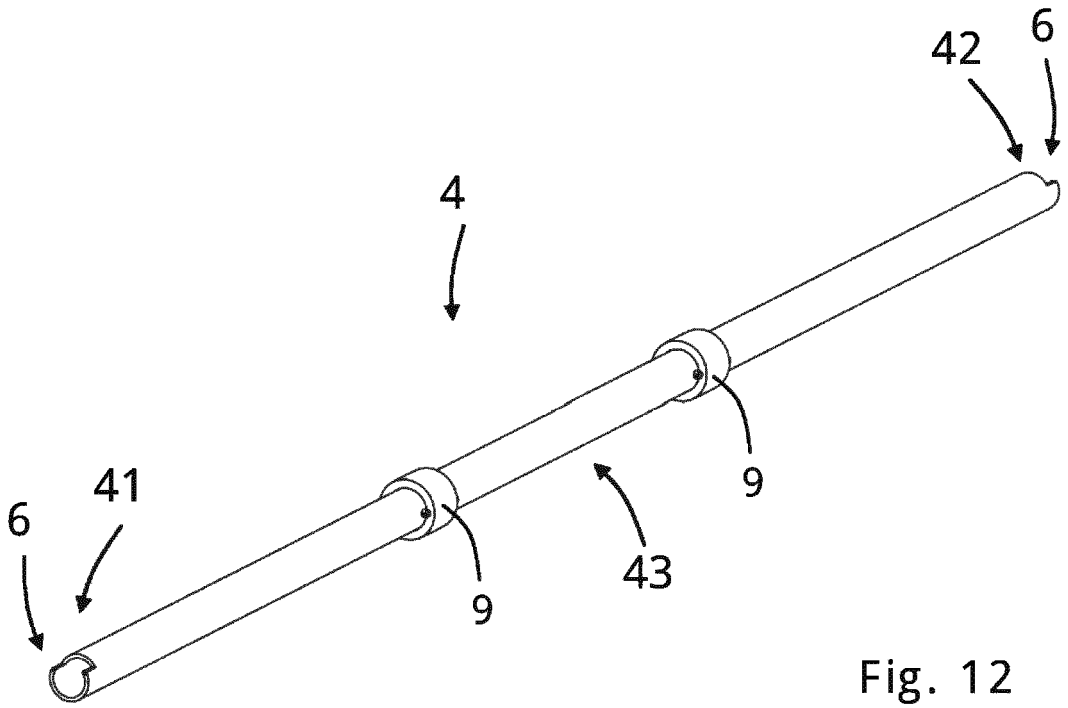

Fig. 12

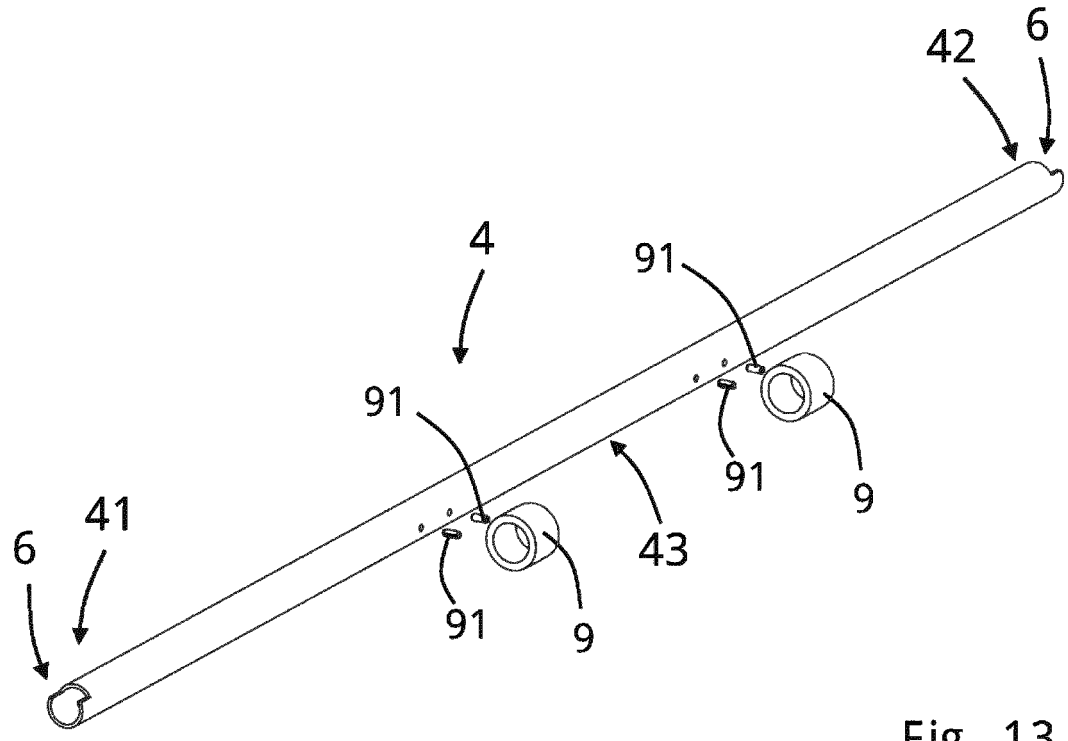

Fig. 13

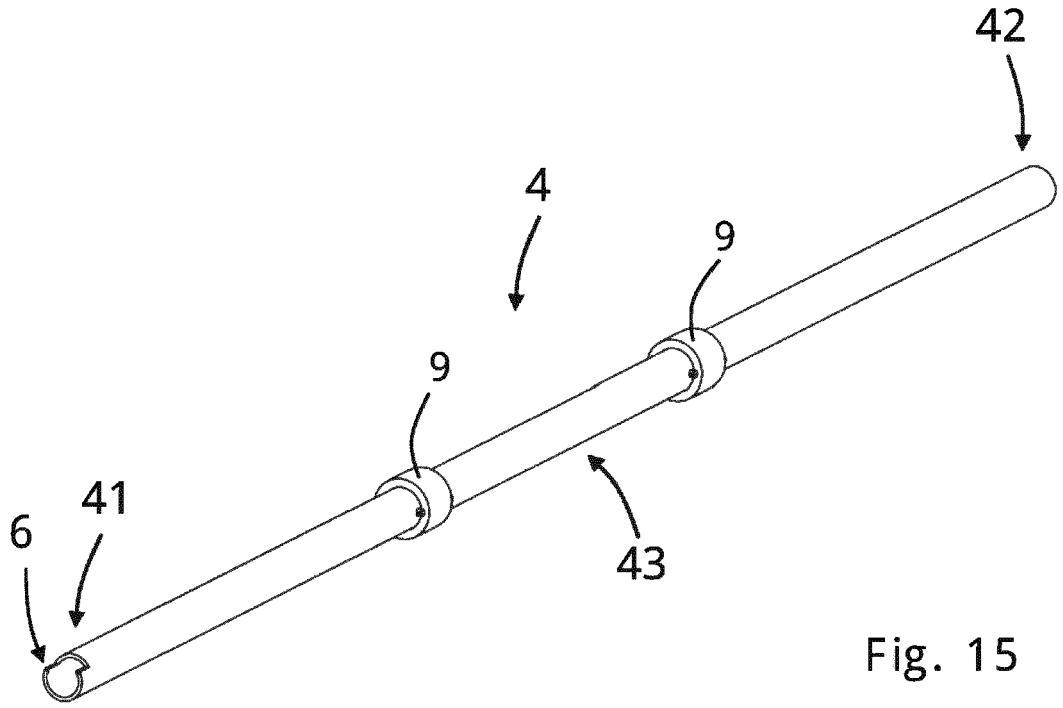

Fig. 15

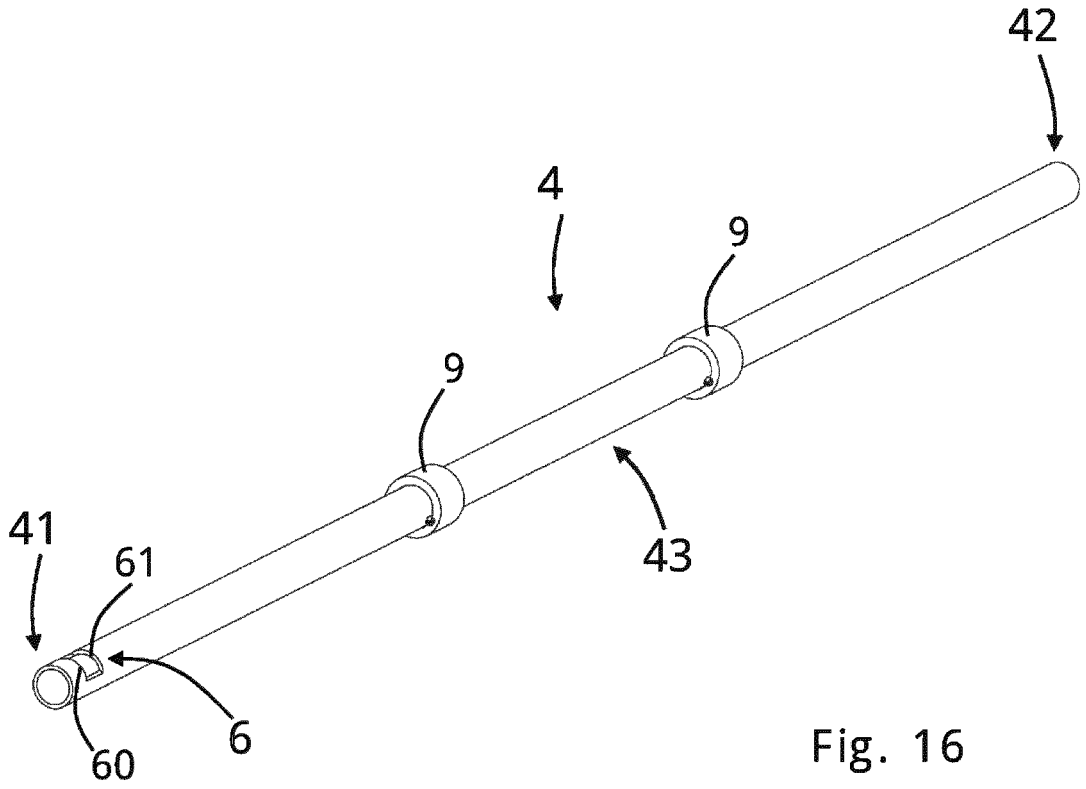

Fig. 16

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EUROPEAN SEARCH REPORT

Application Number
EP 23 17 2788

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	EP 0 107 798 A1 (OMV OFF MECC VILMINORE [IT]) 9 May 1984 (1984-05-09) * page 3, line 11 - page 4, line 6 * * page 5, line 2 - line 16 * * figures 1-8 *	1-15	INV. D03D49/20 B65H20/02
A	JP H02 293446 A (TSUDAKOMA IND CO LTD) 4 December 1990 (1990-12-04) * the whole document *	1-15	
A	JP 2000 080539 A (TOYODA AUTOMATIC LOOM WORKS) 21 March 2000 (2000-03-21) * figures 1-7 * * paragraph [0015] - paragraph [0028] *	1-15	

TECHNICAL FIELDS SEARCHED (IPC)

D03D
D04B
F16C
B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	27 October 2023	Hausding, Jan

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27-10-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0107798 A1	09-05-1984	AT E35703 T1	15-07-1988
		EP 0107798 A1	09-05-1984
		HK 103390 A	14-12-1990
		IT 1210942 B	29-09-1989
JP H02293446 A	04-12-1990	NONE	
JP 2000080539 A	21-03-2000	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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Patent documents cited in the description

- EP 0107798 A1 **[0002]**