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(54) **ACCUMULATION YARN FEEDER PROVIDED WITH A SPACER DEVICE FOR SEPARATING THE
LOOPS OF YARN WOUND ON THE DRUM**

SPEICHERFADENZUFÜHRER MIT ABSTANDSVORRICHTUNG ZUR TRENNUNG DER AUF DIE
TROMMEL GEWICKELTEN FADENSCHLAUFEN

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(56) References cited:

EP-A1- 3 587 643 JP-A- H07 133 553
JP-A- 2000 073 255

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Description

[0001] The present invention relates to an accumulation yarn feeder provided with a spacer device for separating the loops of yarn wound on the drum.

[0002] As is known, a yarn feeder of the so-called "accumulation" type can comprise a drum on which multiple loops of yarn forming a reserve are wound. The loops of yarn unwind from the drum by being drawn by a generic downstream textile machine.

[0003] As the drum empties, a motorized flywheel which is coaxial to the drum winds new yarn taken from an upstream supply spool on said drum.

[0004] As is known, the yarn feeder can be provided with a spacer device that has the purpose of keeping the loops of yarn wound on the drum mutually and evenly spaced, so as to ensure a smooth and regular unwinding of the yarn from the drum, also as a function of the tension control to which the yarn exiting said drum is subjected.

[0005] In a per se known manner, for example, from EP 0829442 B1, the spacer device can comprise a hub, which is fitted freely on the driving shaft that turns the flywheel and supports a series of fingers which are extended in a substantially longitudinal direction with respect to the axis of the hub and are inserted in respective longitudinal slits provided on the drum.

[0006] At least one rolling bearing and a bush integral with the driving shaft are interposed between the hub and the driving shaft. The bush has an external cylindrical surface that has an axis that is oblique with respect to the axis of the driving shaft and is engaged by the internal ring of the bearing.

[0007] As a result of the engagement of the hub with the bush, the fingers perform an oscillating motion which has a longitudinal component, which produces the progressive advancement of the loops of yarn as they are wound onto the drum.

[0008] In order to block the rotation of the hub with respect to the drum and, at the same time, allow said oscillating motion of the fingers, said fingers are connected to the drum by means of a partially yielding joint.

[0009] JP H07 133553 A discloses an accumulation yarn feeder according to the preamble of claim 1.

[0010] In a known embodiment, the joint has a central tubular portion made of rubber with a corrugated wall, and two annular elements made of rigid plastic material which are integral with the opposite axial ends of the central tubular portion. By means of the two annular elements, the joint is fixed respectively to the ends of the fingers and to the drum.

[0011] In known solutions, the two annular elements are vulcanized on the central tubular portion.

[0012] As is known, this solution is appreciated because it greatly facilitates the assembly of the spacer device inside the drum, but it has the drawback that the treatments to which the annular elements must be subjected, as well as the subsequent vulcanization process, are relatively expensive.

[0013] Therefore, the aim of the present invention is to provide an accumulation yarn feeder provided with a spacer device adapted to separate the loops of yarn wound on the drum which, with respect to the known systems cited above, is cheaper to manufacture but equally easy to assemble in the drum of the feeder.

[0014] This aim and other objects which will become better apparent from the following description are achieved by a yarn feeder having the characteristics described in claim 1, while the dependent claims define other advantageous characteristics of the invention.

[0015] The invention will be now described in greater detail, with reference to some preferred but not exclusive embodiments thereof, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a perspective view of an accumulation yarn feeder of the type to which the present invention relates;

Figure 2 is an exploded perspective view of an end portion of the accumulation yarn feeder of Figure 1, in which a spacer device according to the invention is incorporated;

Figure 3 is an exploded perspective view showing separately the spacer device of Figure 2;

Figure 4 is an axial sectional view of the end portion of Figure 2;

Figure 5 is a view similar to Figure 3, showing a further embodiment of the invention.

[0016] With initial reference to Figure 1, a generic accumulation yarn feeder 10 comprises a hollow drum 12, which is adapted to carry a variety of yarn loops (not shown) that form a reserve wound thereon. The yarn is adapted to unwind from the drum 12 when drawn by a generic downstream textile machine (not shown). In a per se known manner, before being transferred to the textile machine, the yarn being unwound from the drum 12 passes through a weft braking device 14 which controls its mechanical tension. The weft braking device 14, which is not part of the aim and objects of the present invention, can be of the conventional type and therefore it will not be described herein in detail.

[0017] As the drum 12 empties, per se known winding means, which in this embodiment comprise a motorized flywheel 16, wind on the drum 12 new yarn taken from an upstream supply spool (not shown). The flywheel 16 rotates coaxially to the drum 12 under the actuation of a motor 18.

[0018] The yarn feeder 10 is provided with a spacer device 20 the purpose of which is to keep the loops of yarn wound on the drum 12 mutually regularly spaced, so as to ensure a smooth and regular unwinding of the yarn from the drum 12, also as a function of the tension control to which the yarn is subjected by the weft braking device 14.

[0019] In a per se known manner, the spacer device 20 can comprise a hub 22 from which a series of spokes

24, for example, five mutually angularly equidistant spokes 24, protrudes radially. The spokes 24 support respective fingers 26 at their external ends, which extend in a substantially longitudinal direction with respect to the axis of the hub.

[0020] The hub 22 is fitted freely on the driving shaft 30 that turns the flywheel 16, with the fingers 26 inserted in respective longitudinal slits 28 provided on the drum 12. The fingers 26 are rendered integral in rotation with the drum 12 in the manner that will be described in detail hereinafter. At least one rolling bearing - two bearings 31 in this embodiment (Figure 4) - and a bush 32 (Figure 3) keyed on the driving shaft 30 are interposed between the hub 22 and the driving shaft 30.

[0021] In a per se conventional manner, the bush 32 has an external cylindrical surface, which is engaged by the internal rings of the rolling bearings 31, that has an axis that is oblique with respect to the axis of the driving shaft 30.

[0022] The rotation of the bush 32 imparts to the hub 22 and to the fingers 26 integral therewith, an oscillating motion that has a longitudinal component. In a per se conventional manner, this oscillating motion produces a progressive advancement of the loops of yarn, as they are wound on the drum 12, by virtue of which the loops of yarn remain regularly mutually equidistant.

[0023] The fingers 26 are connected to the drum 12 by a joint 33 which is configured to prevent the rotation of the fingers 26 around the axis of the drum 12 and at the same time allow said oscillating motion.

[0024] The joint 33 according to the invention comprises a hollow body 34 which is formed in one piece and has an internal annular portion 36 provided with a series of first internal longitudinal slots 38 which engage, in a per se axially free manner, corresponding longitudinal protrusions 58 which are integral with the drum 12, so as to render the internal annular portion 36 integral in rotation with the drum 12, an external annular portion 40 provided with a series of external longitudinal slots 42 which engage, in a per se axially free manner, corresponding longitudinal ribs 46 provided on the fingers 26, so as to render the external annular portion integral in rotation with the fingers 26, and an intermediate portion 48 which is yielding in a longitudinal direction and is substantially rigid in torsion.

[0025] Preferably, the internal annular portion 36 is axially blocked with respect to the drum 12 and, for this purpose, it is sandwiched, by clamping means which will be described in greater detail hereinafter, between an abutment 50 that is integral with the drum 12 and a flange 54.

[0026] In this embodiment, the abutment 50 has a substantially tubular profile, is accommodated coaxially inside the drum 12, and has a series of second internal longitudinal slots 52 (Figure 3) aligned with the first ones; the longitudinal protrusions 58 being provided on a tubular extension 56 of the flange 54 and engaging both the first internal longitudinal slots 38 and the second internal

longitudinal slots 52.

[0027] Preferably, the hollow body 34 is made of a material that can flex elastically, advantageously neoprene or chloroprene. Furthermore, the intermediate portion 48 preferably has a thin-walled profile extending in a radial direction, and at least one corrugation in order to ensure suitable yielding in a longitudinal direction.

[0028] Advantageously, for lightening purposes, the external longitudinal slots 42 are provided on respective radial protrusions 57 which extend monolithically outward from the external annular portion 40.

[0029] With reference to Figure 4, the flange 54 has an outer flat portion 54a and an inner conical portion 54b which engages externally a corresponding bevel 59 provided on the internal tubular portion 36.

[0030] The clamping means comprise a bushing 60 which is threaded internally (Figure 4), is accommodated in the abutment 50 and is integral therewith, and a first screw 62 which is inserted in the flange 54 and is screwed to one end of the bushing 60. Advantageously, as shown in the figures, a screw provided with a conical head is used in order to engage the conical portion 54b of the flange 54 to ensure correct centering.

[0031] The abutment 50 is fixed to a front wall 12a of the drum 12 by means of a second screw 64 which is provided with a knob 66 for manual tightening. The second screw 64 is inserted in the front wall 12a and is screwed to the opposite end of the bushing 60 with respect to the first screw 62.

[0032] With particular reference to Figures 3 and 4, the external tubular portion 40 of the hollow body 34 is delimited axially between a first flat end surface 40a which faces the hub 22 and a second flat end surface 40b which faces the front wall 12a of the drum 12. The first flat end surface 40a has an annular groove 68 which engages, for centering purposes, a corresponding annular lip 22a which extends axially from the end of the hub 22.

[0033] In the embodiment described herein, the abutment 50 has an appendage 70 for supporting sensors and any other accessory devices that lie outside the aim and objects of the present invention.

[0034] In operation, in a per se conventional manner, while the driving shaft 30 turns in order to wind new loops of yarn onto the drum 12 by virtue of the flywheel 16, the hub 22, and the fingers 26 with it, perform an oscillating motion imparted by the bush on which the hub 22, by means of the rolling bearings 31, is fitted.

[0035] The hollow body 22 prevents the rotation of the hub 22 and of the fingers 26 with respect to the drum 12 but, by deforming in the region of the intermediate portion 48, allows the above mentioned oscillating motion.

[0036] In practice it has been demonstrated that the system according to the invention allows to fully achieve the intended aim and objects.

[0037] In particular, the assembly of the spacer device 20, and particularly of the joint 33, in the drum 12 is very easy. For example, first the hollow body 34 can be fixed to the abutment 50 by means of the flange 54 and the

first screw 62. Then it is possible to fix the unit thus assembled to the drum 12 by means of the second screw 64. Finally, the drum can be fixed to the body of the feeder 10. By placing the drum 12 axially adjacent to the body of the feeder 10, the external longitudinal slots 42 of the external tubular portion 40 engage the longitudinal ribs 46 of the fingers 26, while the annular groove 68 engages the annular lip 22a of the hub 22, thus ensuring a perfect centering.

[0038] The manufacture of the joint according to the invention does not require particular treatments and therefore is much cheaper than known solutions, which are based on vulcanization treatments.

[0039] Figure 5 shows a further embodiment of the invention, in which elements similar or identical to those of the previous embodiment are designated by the same reference numeral increased by 100.

[0040] In particular, this embodiment differs from the preceding one in that the longitudinal protrusions 158, which engage the first internal longitudinal slots 138 of the internal annular portion 136 of the hollow body 134, are provided on a tubular extension 156 which is integral with the abutment 150, and the internal annular portion 136 is sandwiched between the abutment 150 and a washer 154, which takes the place of the flange of the previous embodiment, by virtue of a screw 162 screwed on the tubular extension 156.

[0041] Some preferred embodiments of the invention have been described, but of course the person skilled in the art will be able to make various modifications and variations within the scope of the claims.

[0042] For example, the longitudinal slots, which acts as rotational coupling surfaces, and the longitudinal protrusions and the longitudinal ribs, which act as rotational coupling counter-surfaces, might be swapped. Moreover, the rotational coupling may be provided differently, for example, by engagement between polygonal surfaces.

[0043] Naturally, the mechanism that produces the oscillation of the fingers lies completely outside the aim and objects of the present invention and may be provided differently from what is described here and illustrated by way of example, for example, with systems based on cams or on articulated levers.

[0044] The shape of the hollow body 34 also may be modified within the limits of what is claimed. For example, depending on the available spaces, the intermediate portion could be extended in an axial direction instead of radially as in the example described herein, and/or it might have a greater number of corrugations.

[0045] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. An accumulation yarn feeder, comprising a hollow drum (12) on which motorized winding means (16) wind loops of yarn, and a spacer device (20) provided with a series of fingers (26) which are inserted in respective longitudinal slits (28) of the drum (12) and are actuated with an oscillating motion that has a longitudinal component, so as to produce the progressive advancement of the loops of yarn while winding on the drum (12), said fingers (26) being connected to said drum (12) by a partially yielding joint (33) which is configured to prevent the rotation of the fingers (26) around the axis of the drum (12) and allow said oscillating motion, wherein said joint (33) comprises a hollow body (34) which is formed in one piece, **characterised in that** said joint has
 - an internal annular portion (36) provided with first rotational coupling surfaces (38) which engage, in a per se axially free manner, corresponding first rotational coupling counter-surfaces (58) which are integral with the drum (12), so as to make said internal annular portion (36) integral in rotation with the drum (12),
 - an external annular portion (40) provided with second rotational coupling surfaces (42) which engage, in a per se axially free manner, corresponding second rotational coupling counter-surfaces (46) which are integral with the fingers (26), so as to make said external annular portion (40) integral in rotation with the fingers (26), and
 - an intermediate portion (48) which is yielding in a longitudinal direction and is substantially rigid in torsion.
2. The accumulation yarn feeder according to claim 1, **characterised in that** said internal annular portion (36) is sandwiched, by clamping means (60, 62), between an abutment (50) that is integral with the drum (12) and a flange (54).
3. The accumulation yarn feeder according to claim 2, **characterised in that** said abutment (50) has a substantially tubular profile and is provided with third rotational coupling surfaces (52) aligned with the first rotational coupling surfaces (38); said first rotational coupling counter-surfaces (58) being provided on a tubular extension (56) of said flange (54) and engaging both said first rotational coupling surfaces (38) and said third rotational coupling surfaces (52).
4. The accumulation yarn feeder according to claim 3, **characterised in that** said first rotational coupling surfaces comprise a series of internal longitudinal slots (38) provided on said internal annular portion (36), said third rotational coupling surfaces comprise a series of internal longitudinal slots (52) provided

on said abutment (50), and said first rotational coupling counter-surfaces comprise a series of longitudinal protrusions (58) which are inserted in said first internal longitudinal slots (38) and said second internal longitudinal slots (52).

5. The accumulation yarn feeder according to one of claims 1-4, **characterized in that** said second rotational coupling surfaces comprise a series of external longitudinal slots (42) and said second rotational coupling counter-surfaces comprise a series of corresponding longitudinal ribs (46) provided on said fingers (26).
6. The accumulation yarn feeder according to claim 5, **characterized in that** said external longitudinal slots (42) are provided at the ends of respective radial protrusions (57) which extend monolithically outward from said external annular portion (40).
7. The accumulation yarn feeder according to one of claims 3-6, **characterized in that** said clamping means comprise a bushing (60) which is threaded internally and is inserted in said abutment (50), and a first screw (62) which is inserted in said flange (54) and is screwed to one end of said bushing (60).
8. The accumulation yarn feeder according to claim 7, **characterized in that** said abutment (50) is fixed to a front wall (12a) of said drum (12) by means of a second screw (64) that is inserted in the front wall (12a) and is screwed to the opposite end of said bushing (60).
9. The accumulation yarn feeder according to claim 8, **characterized in that** said second screw (64) is provided with a knob (66) for manual tightening.
10. The accumulation yarn feeder according to one of claims 1-9, wherein said fingers are integral with a hub (22) which is coaxial with said drum (12), **characterized in that** said external tubular portion (40) is delimited axially by a flat surface (40a) which faces said hub (22) and is provided with an annular groove (68) which engages, for centering purposes, a corresponding annular lip (22a) which extends axially from said hub (22).
11. The accumulation yarn feeder according to one of claims 1-10, **characterized in that** said hollow body (34) is made of an elastically yielding material.
12. The accumulation yarn feeder according to one of claims 1-11, **characterized in that** said intermediate portion (48) has a thin-walled profile extending in a radial direction.
13. The accumulation yarn feeder according to one of

claims 1-12, **characterized in that** said intermediate portion (48) has at least one corrugation.

14. The accumulation yarn feeder according to claim 2, **characterized in that** said abutment (50) has a substantially tubular profile and said first rotational coupling counter-surfaces (158) are provided on said abutment (150).
15. The accumulation yarn feeder according to claim 14, **characterized in that** said first rotational coupling surfaces comprise a series of internal longitudinal slots (138) provided on said internal annular portion (136), and said first rotational coupling counter-surfaces comprise a series of longitudinal protrusions (158) provided on a tubular extension (156) of the abutment (150) and inserted in said first internal longitudinal slots (138).

Patentansprüche

1. Ein Speicherfadenzuführer, der eine hohle Trommel (12) umfasst, auf welche motorisierte Wicklungsmittel (16) Fadenschlaufen aufwickeln, und eine Abstandsvorrichtung (20), versehen mit einer Reihe von Fingern (26), welche in entsprechende Längsschlitze (28) der Trommel (12) eingeführt und mit einer oszillierenden Bewegung angetrieben werden, die eine Längskomponente hat, um die progressive Vorwärtsbewegung der Fadenschlaufen beim gleichzeitigen Aufwickeln auf die Trommel (12) sicherzustellen; wobei die Finger (26) mit der Trommel (12) über ein teilweise elastisches Verbindungselement (33) verbunden sind, welches ausgebildet ist, um die Drehung der Finger (26) um die Achse der Trommel (12) zu verhindern und um die oszillierende Bewegung zu ermöglichen; wobei das Verbindungselement (33) einen Hohlkörper (34) umfasst, der einteilig geformt ist; **dadurch gekennzeichnet, dass** das Verbindungselement Folgendes hat:

- einen ringförmigen inneren Abschnitt (36), ausgestattet mit ersten Drehkopplungs-Oberflächen (38), welche auf eine an sich axial freie Art mit entsprechenden ersten Drehkopplungs-Gegenflächen (58) in Eingriff stehen, die mit der Trommel (12) integral sind, um so den ringförmigen inneren Abschnitt (36) in der Drehung integral mit der Trommel (12) zu machen,
- einen ringförmigen äußeren Abschnitt (40), ausgestattet mit zweiten Drehkopplungs-Oberflächen (42), welche auf eine an sich axial freie Art mit entsprechenden zweiten Drehkopplungs-Gegenflächen (46) in Eingriff stehen, die mit den Fingern (26) integral sind, um so den ringförmigen äußeren Abschnitt (40) in der Drehung integral mit den Fingern (26) zu machen,

- und
- einen intermediären Abschnitt (48), der in einer Längsrichtung elastisch und in der Torsion im Wesentlichen starr ist.
2. Der Speicherfadenzuführer gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der ringförmige innere Abschnitt (36) durch Klemmmittel (60, 62) zwischen einem Widerlager (50), das integral mit der Trommel (12) ist, und einem Flansch (54) eingeschlossen ist. 5
 3. Der Speicherfadenzuführer gemäß Anspruch 2, **dadurch gekennzeichnet, dass** das Widerlager (50) ein im Wesentlichen rohrförmiges Profil hat und mit dritten Drehkopplungs-Oberflächen (52) ausgestattet ist, die mit den ersten Drehkopplungs-Oberflächen (38) ausgerichtet sind; wobei die ersten Drehkopplungs-Gegenflächen (58) an einer rohrförmigen Verlängerung (56) des Flanschs (54) angebracht sind und sowohl mit den ersten Drehkopplungs-Oberflächen (38) als auch mit den dritten Drehkopplungs-Oberflächen (52) in Eingriff stehen. 10
 4. Der Speicherfadenzuführer gemäß Anspruch 3, **dadurch gekennzeichnet, dass** die ersten Drehkopplungs-Oberflächen eine Reihe innerer Längsschlitze (38) umfassen, die an dem ringförmigen inneren Abschnitt (36) angebracht sind, wobei die dritten Drehkopplungs-Oberflächen eine Reihe innerer Längsschlitze (52) umfassen, die an dem Widerlager (50) angebracht sind, und die ersten Drehkopplungs-Gegenflächen eine Reihe länglicher Vorsprünge (58) umfassen, welche in die ersten inneren Längsschlitze (38) und die zweiten inneren Längsschlitze (52) eingeführt sind. 15
 5. Der Speicherfadenzuführer gemäß einem der Ansprüche 1-4, **dadurch gekennzeichnet, dass** die zweiten Drehkopplungs-Oberflächen eine Reihe äußerer Längsschlitze (42) umfassen und die zweiten Drehkopplungs-Gegenflächen eine Reihe entsprechender Längsrippen (46) umfassen, die an den Fingern (26) angebracht sind. 20
 6. Der Speicherfadenzuführer gemäß Anspruch 5, **dadurch gekennzeichnet, dass** die äußeren Längsschlitze (42) an den Enden entsprechender radialer Vorsprünge (57) angebracht sind, die sich monolithisch von dem ringförmigen äußeren Abschnitt (40) nach außen erstrecken. 25
 7. Der Speicherfadenzuführer gemäß einem der Ansprüche 3-6, **dadurch gekennzeichnet, dass** die Klemmmittel eine Buchse (60) umfassen, die ein Innengewinde hat und in das Widerlager (50) eingeführt ist, und eine erste Schraube (62), die in den Flansch (54) eingesetzt und mit einem Ende der Buchse (60) verschraubt ist. 30
 8. Der Speicherfadenzuführer gemäß Anspruch 7, **dadurch gekennzeichnet, dass** das Widerlager (50) an einer vorderen Wand (12a) der Trommel (12) mit Hilfe einer zweiten Schraube (64) befestigt ist, die in die vordere Wand (12a) eingeführt und mit dem gegenüberliegenden Ende der Buchse (60) verschraubt ist. 35
 9. Der Speicherfadenzuführer gemäß Anspruch 8, **dadurch gekennzeichnet, dass** die zweite Schraube (64) mit einem Knopf (66) zum manuellen Festziehen ausgestattet ist. 40
 10. Der Speicherfadenzuführer gemäß einem der Ansprüche 1-9, wobei die Finger integral mit einer Nabe (22) sind, die coaxial mit der Trommel (12) ist, **dadurch gekennzeichnet, dass** der äußere rohrförmige Abschnitt (40) axial von einer flachen Oberfläche (40a) begrenzt ist, die der Nabe (22) zugewandt und mit einer Ringnut (68) versehen ist, welche zum Zwecke der Zentrierung mit einer entsprechenden ringförmigen Lippe (22a) in Eingriff steht, die sich axial von der Nabe (22) erstreckt. 45
 11. Der Speicherfadenzuführer gemäß einem der Ansprüche 1-10, **dadurch gekennzeichnet, dass** der Hohlkörper (34) aus einem elastisch nachgebenden Material besteht. 50
 12. Der Speicherfadenzuführer gemäß einem der Ansprüche 1-11, **dadurch gekennzeichnet, dass** der intermediäre Abschnitt (48) ein dünnwandiges Profil hat, das sich in eine radiale Richtung erstreckt. 55
 13. Der Speicherfadenzuführer gemäß einem der Ansprüche 1-12, **dadurch gekennzeichnet, dass** der intermediäre Abschnitt (48) mindestens eine Riffelung hat.
 14. Der Speicherfadenzuführer gemäß Anspruch 2, **dadurch gekennzeichnet, dass** das Widerlager (50) ein im Wesentlichen rohrförmiges Profil hat und die ersten Drehkopplungs-Gegenflächen (158) an dem Widerlager (150) angebracht sind.
 15. Der Speicherfadenzuführer gemäß Anspruch 14, **dadurch gekennzeichnet, dass** die ersten Drehkopplungs-Oberflächen eine Reihe innerer Längsschlitze (138) umfassen, die an den ringförmigen inneren Abschnitt (136) angebracht sind, und die ersten Drehkopplungs-Gegenflächen eine Reihe länglicher Vorsprünge (158) umfassen, die an einer rohrförmigen Verlängerung (156) des Widerlagers (150) angebracht und in die ersten inneren Längsschlitze (138) eingeführt sind.

Revendications

1. Dispositif d'alimentation de fil à accumulation, comprenant un tambour creux (12) sur lequel des moyens d'enroulement motorisés (16) enroulent des boucles de fils, et un dispositif d'espacement (20) pourvu d'une série de doigts (26) qui sont insérés dans des fentes longitudinales (28) respectives du tambour (12) et sont actionnés avec un mouvement d'oscillation qui a une composante longitudinale, de façon à produire l'avancement progressif des boucles de fil pendant l'enroulement sur le tambour (12), lesdits doigts (26) étant connectés audit tambour (12) par un joint (33) en partie flexible qui est configuré pour empêcher la rotation des doigts (26) autour de l'axe du tambour (12) et permettre ledit mouvement d'oscillation, dans lequel ledit joint (33) comprend un corps creux (34) qui est formé d'une seule pièce, **caractérisé en ce que** ledit joint comporte
 - une partie annulaire intérieure (36) pourvue de premières surfaces de couplage en rotation (38) qui viennent en prise, d'une manière axialement libre en soi, correspondant à des premières contre-surfaces de couplage en rotation (58) qui sont d'un seul bloc avec le tambour (12), de façon à rendre ladite partie annulaire intérieure (36) d'un seul bloc en rotation avec le tambour (12),
 - une partie annulaire extérieure (40) pourvue de secondes parties de couplage en rotation (42) qui viennent en prise, d'une manière axialement libre en soi, correspondant à des secondes contre-surfaces de couplage en rotation (46) qui sont d'un seul bloc avec les doigts (26), de façon à rendre ladite partie annulaire extérieure (40) d'un seul bloc en rotation avec les doigts (26), et une partie intermédiaire (48) qui est flexible dans une direction longitudinale et est sensiblement rigide en torsion.
2. Dispositif d'alimentation de fil à accumulation selon la revendication 1, **caractérisé en ce que** ladite partie annulaire intérieure (36) est prise en sandwich, par des moyens de serrage (60, 62), entre une butée (50) qui est d'un seul bloc avec le tambour (12) et un rebord (54).
3. Dispositif d'alimentation de fil à accumulation selon la revendication 2, **caractérisé en ce que** ladite butée (50) a un profil sensiblement tubulaire et est pourvue de troisièmes surfaces de couplage en rotation (52) alignées avec les premières surfaces de couplage en rotation (38), lesdites premières contre-surfaces de couplage en rotation (58) étant placées sur une extension tubulaire (56) dudit rebord (54) et venant en prise à la fois avec lesdites premières surfaces de couplage en rotation (38) et lesdites troi-
- sièmes surfaces de couplage en rotation (52).
4. Dispositif d'alimentation de fil à accumulation selon la revendication 3, **caractérisé en ce que** lesdites premières surfaces de couplage en rotation comprennent une série de fentes longitudinales intérieures (38) placées sur ladite partie annulaire intérieure (36), lesdites troisièmes surfaces de couplage en rotation comprennent une série de fentes longitudinales intérieures (52) placées sur ladite butée (50), et lesdites premières contre-surfaces de couplage en rotation (58) comprennent une série de saillies longitudinales (58) qui sont insérées dans lesdites premières fentes longitudinales intérieures (38) et lesdites secondes fentes longitudinales intérieures (52).
5. Dispositif d'alimentation de fil à accumulation selon l'une quelconque des revendications 1-4, **caractérisé en ce que** lesdites secondes surfaces de couplage en rotation comprennent une série de fentes longitudinales extérieures (42) et lesdites secondes contre-surfaces de couplage en rotation comprennent une série de nervures longitudinales correspondantes (46) placées sur lesdits doigts (26).
6. Dispositif d'alimentation de fil à accumulation selon la revendication 5, **caractérisé en ce que** lesdites fentes longitudinales extérieures (42) sont placées aux extrémités de saillies radiales (57) respectives qui s'étendent monolithiquement vers l'extérieur depuis ladite partie annulaire extérieure (40).
7. Dispositif d'alimentation de fil à accumulation selon l'une quelconque des revendications 3-6, **caractérisé en ce que** lesdits moyens de serrage comprennent une bague (60) qui est filetée intérieurement et est insérée dans ladite butée (50), et une première vis (62) qui est insérée dans ledit rebord (54) et est vissée à une extrémité de ladite bague (60).
8. Dispositif d'alimentation de fil à accumulation selon la revendication 7, **caractérisé en ce que** ladite butée (50) est fixée sur une paroi avant (12a) dudit tambour (12) au moyen d'une seconde vis (64) qui est insérée dans la paroi avant (12a) et est vissée sur l'extrémité opposée de ladite bague (60).
9. Dispositif d'alimentation de fil à accumulation selon la revendication 8, **caractérisé en ce que** ladite seconde vis (64) est pourvue d'une molette (66) pour un serrage manuel.
10. Dispositif d'alimentation de fil à accumulation selon l'une quelconque des revendications 1-9, dans lequel lesdits doigts sont d'un seul bloc avec un moyeu (22) qui est coaxial avec ledit tambour (12), **caractérisé en ce que** ladite partie annulaire extérieure

(40) est délimitée axialement par une surface plate (40a) qui fait face audit moyeu (22) et est pourvue d'une rainure annulaire (68) qui vient en prise, pour des besoins de centrage, avec une lèvre annulaire correspondante (22a) qui s'étend axialement depuis ledit moyeu (22). 5

11. Dispositif d'alimentation de fil à accumulation selon l'une quelconque des revendications 1-10, **caractérisé en ce que** ledit corps creux (34) est fait d'un matériau élastiquement flexible. 10
12. Dispositif d'alimentation de fil à accumulation selon l'une quelconque des revendications 1-11, **caractérisé en ce que** ladite partie intermédiaire (48) a un profil à paroi fine s'étendant dans une direction radiale. 15
13. Dispositif d'alimentation de fil à accumulation selon l'une quelconque des revendications 1-12, **caractérisé en ce que** que ladite partie intermédiaire (48) comporte au moins un plissement. 20
14. Dispositif d'alimentation de fil à accumulation selon la revendication 2, **caractérisé en ce que** ladite butée (50) a un profil sensiblement tubulaire et lesdites premières contre-surfaces de couplage en rotation (158) sont placées sur ladite butée (150). 25
15. Dispositif d'alimentation de fil à accumulation selon la revendication 14, **caractérisé en ce que** lesdites premières surfaces de couplage en rotation comprennent une série de fentes longitudinales intérieures (138) placées sur ladite partie annulaire intérieure (136), et lesdites premières contre-surfaces de couplage en rotation comprennent une série de saillies longitudinales (158) placées sur une extension tubulaire (156) de la butée (150) et insérées dans lesdites premières fentes longitudinale intérieures (138). 30
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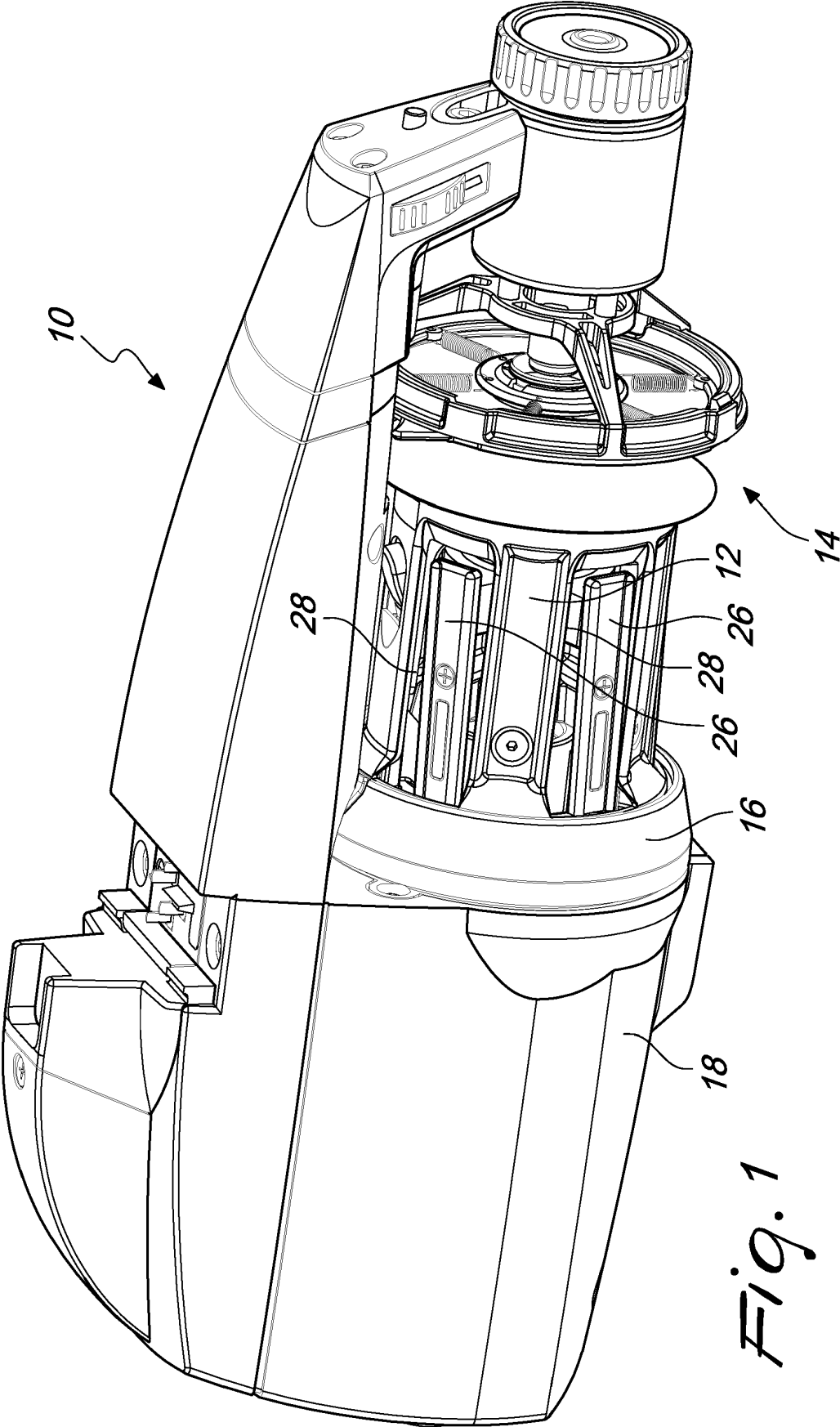


Fig. 1

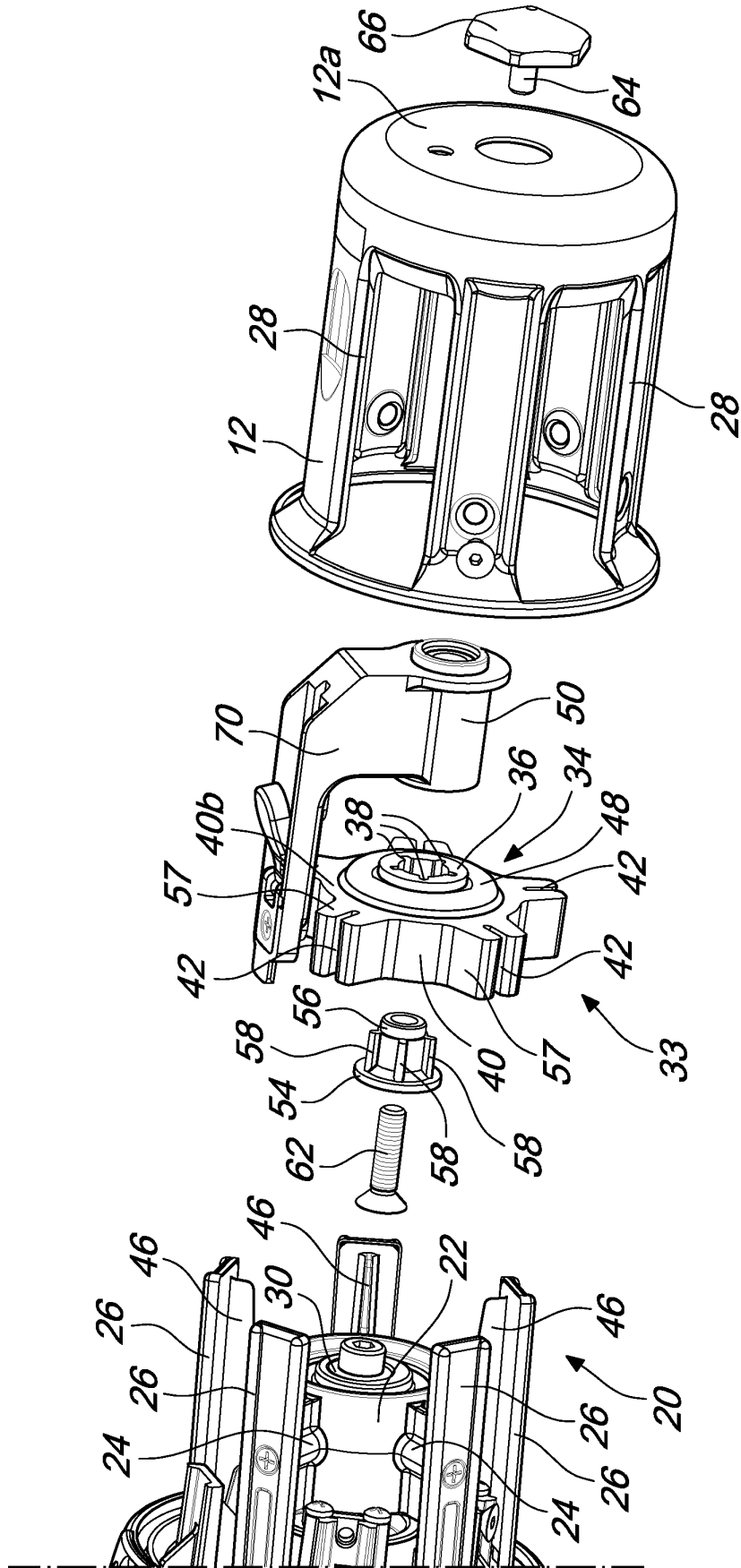


Fig. 2

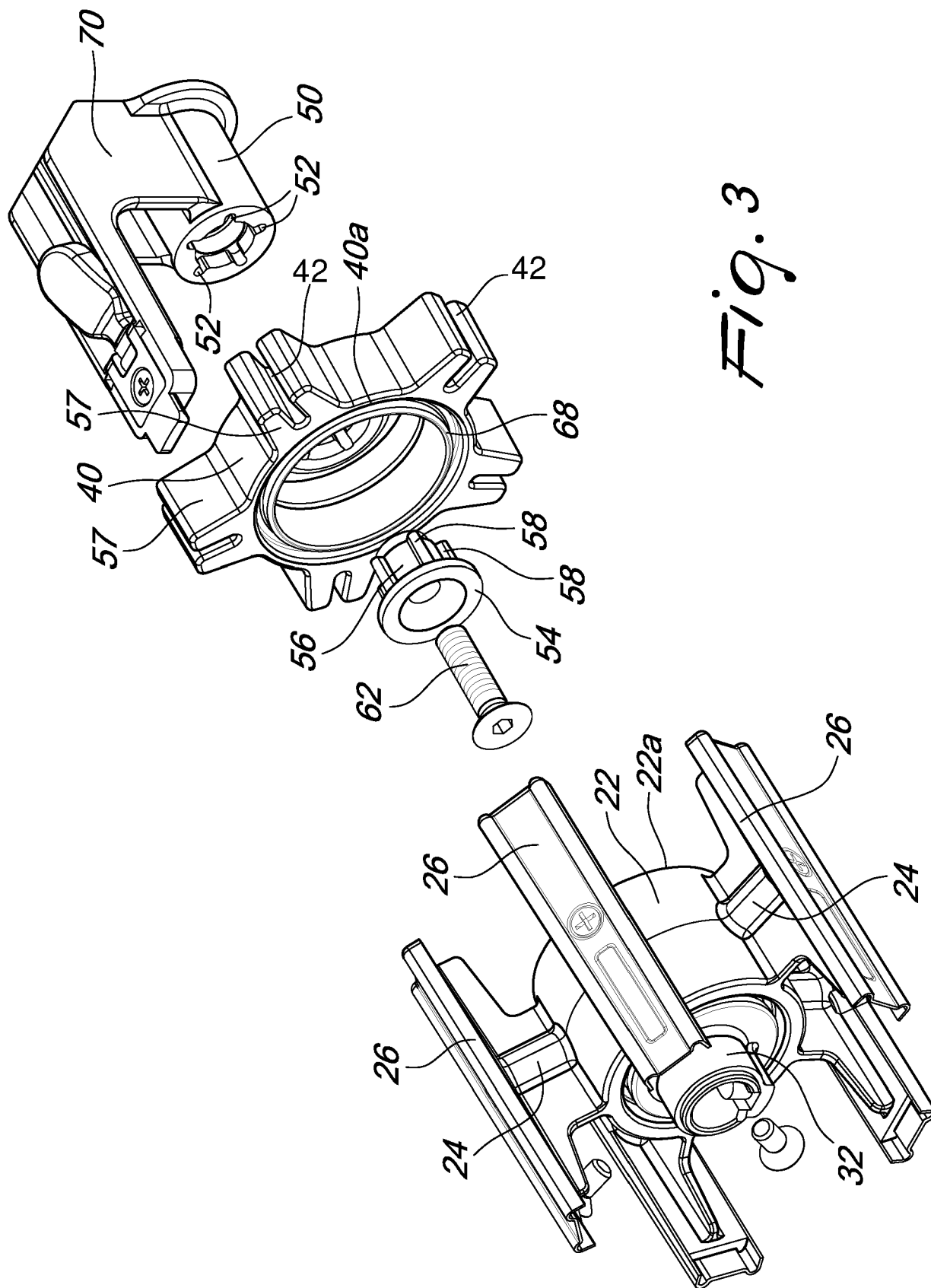


Fig. 3

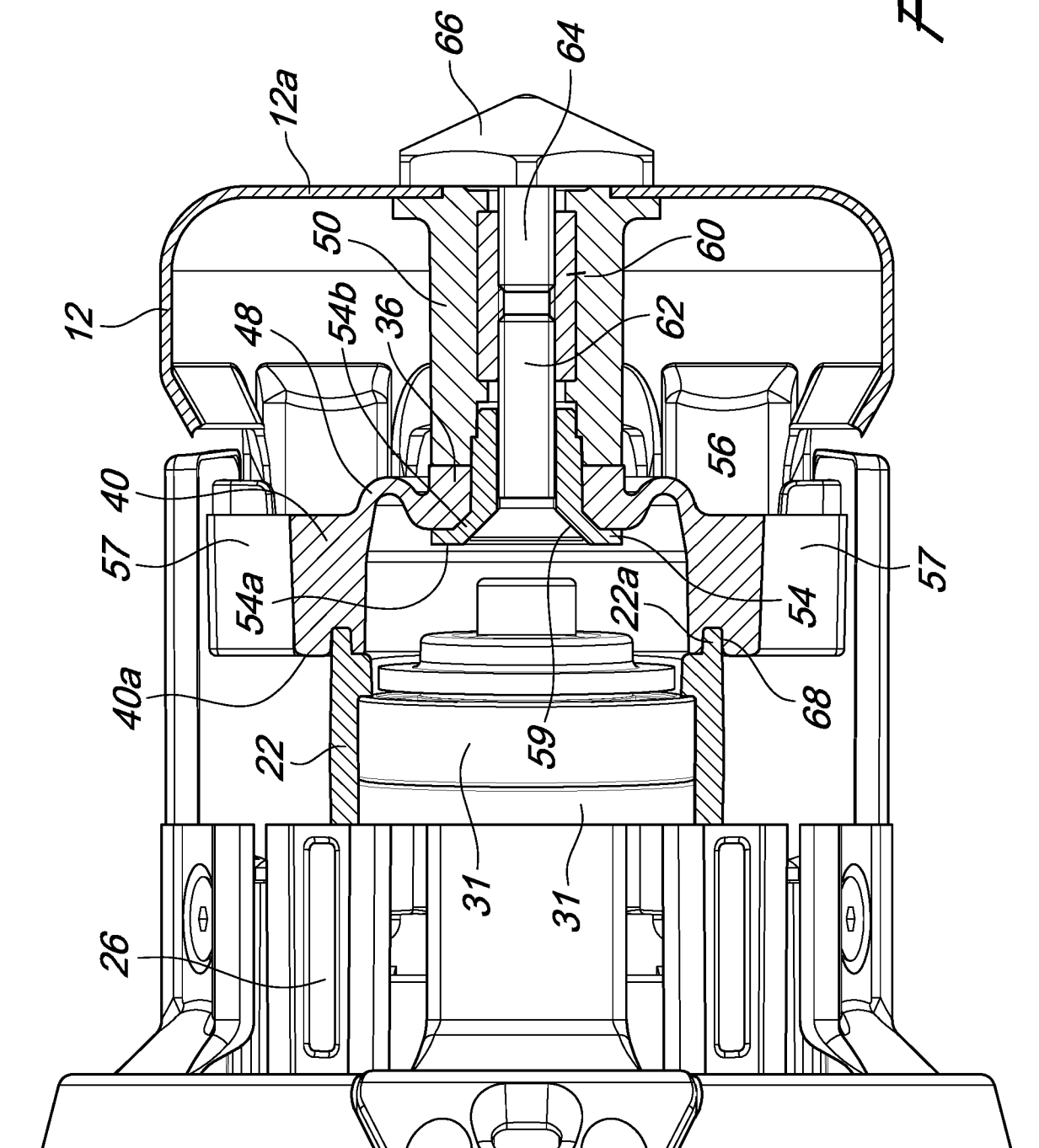


Fig. 4

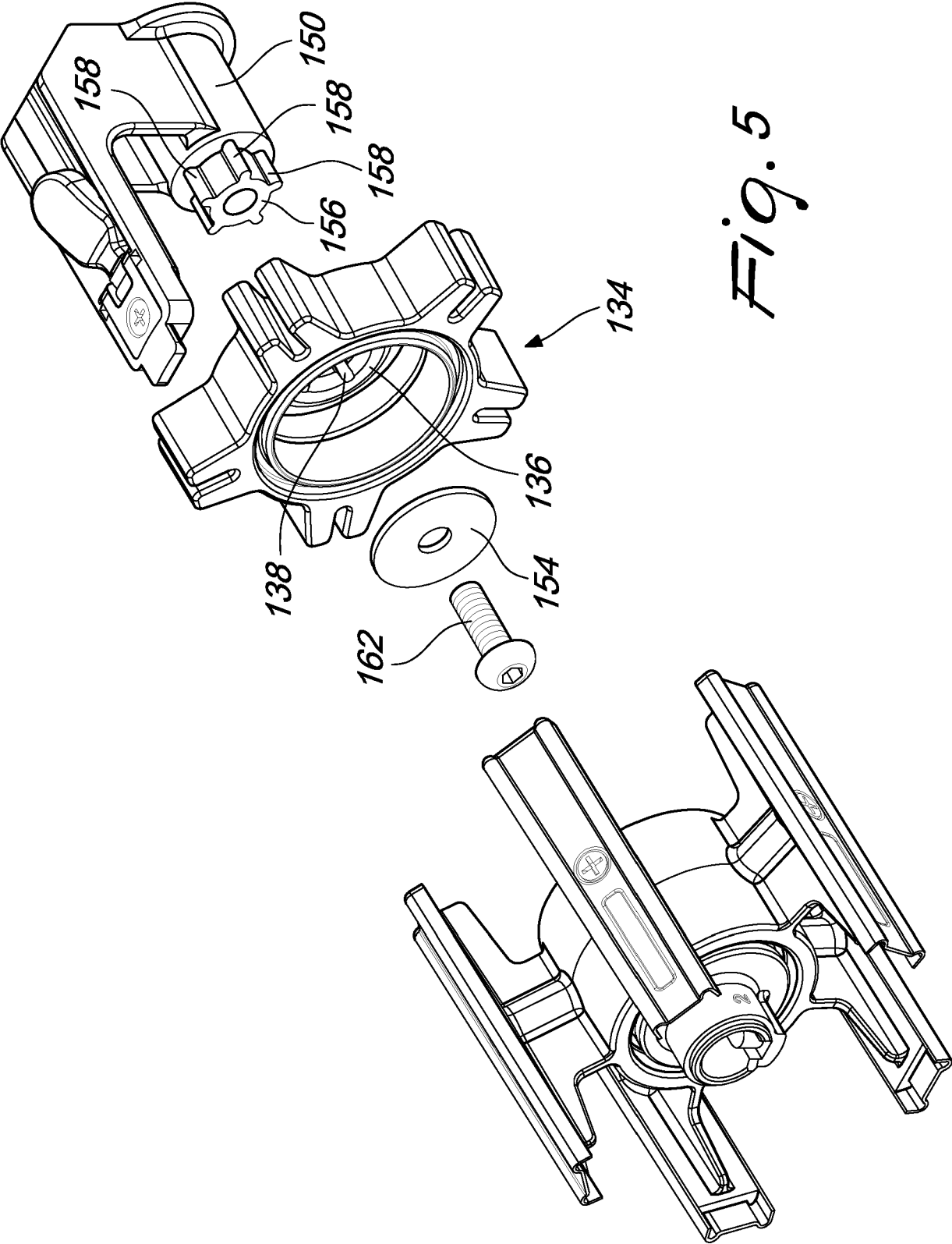


Fig. 5

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 0829442 B1 [0005]
- JP H07133553 A [0009]