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CA 2670465 A1 2008/05/29

(21) 2 670 465

(12) DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION

(13) A1

(86) Date de dépôt PCT/PCT Filing Date: 2007/11/15
(87) Date publication PCT/PCT Publication Date: 2008/05/29
(85) Entrée phase nationale/National Entry: 2009/05/19
(86) N° demande PCT/PCT Application No.: EP 2007/009887
(87) N° publication PCT/PCT Publication No.: 2008/061666
(30) Priorité/Priority: 2006/11/20 (DE10 2006 054 576.1)

(51) Cl.Int./Int.Cl. *B65G 23/08* (2006.01),
B65G 39/09 (2006.01)

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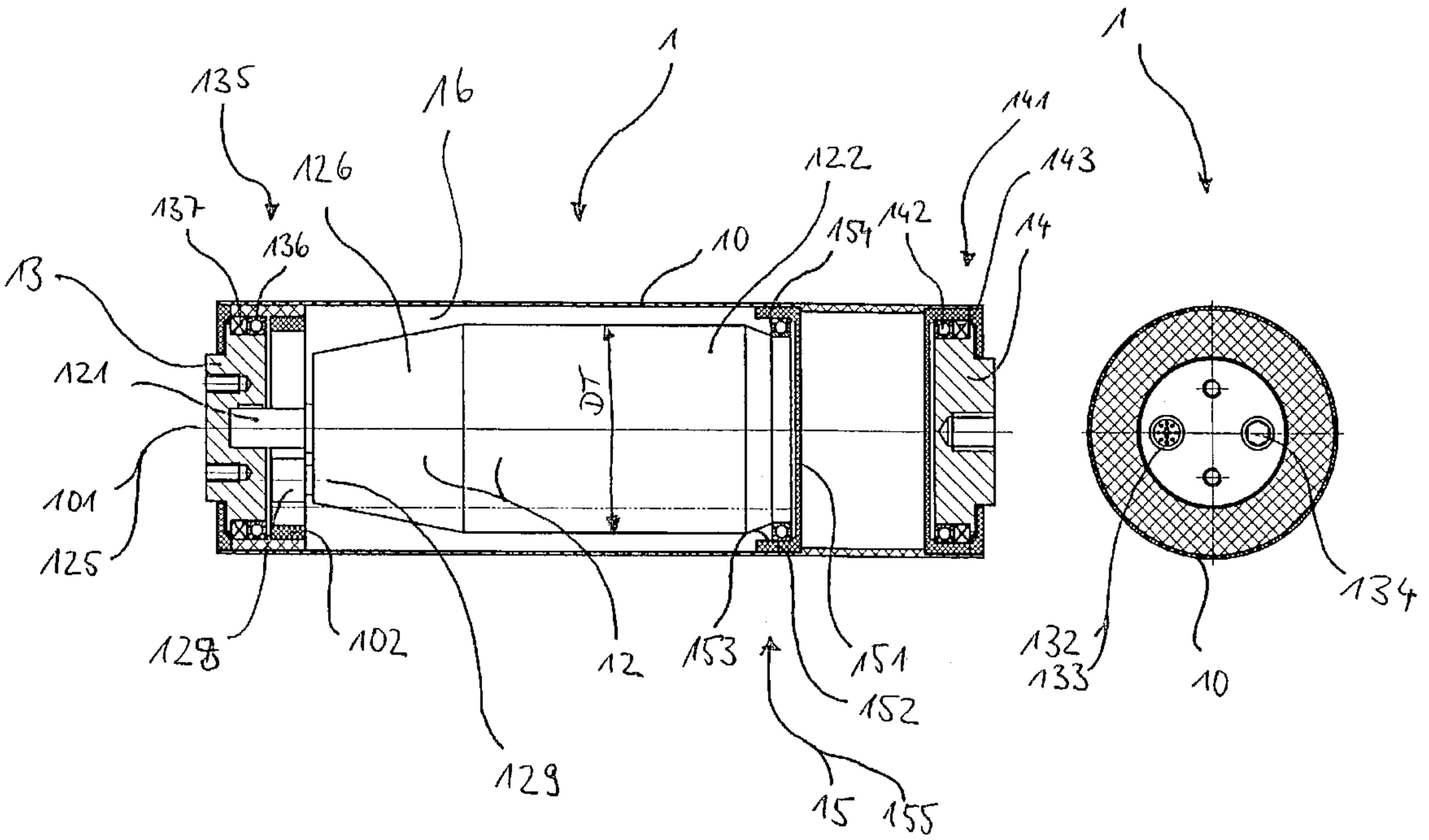
(54) Titre : MOTEUR DE TAMBOUR
(54) Title: BARREL MOTOR



(57) Abrégé/Abstract:
The invention relates to a barrel motor drive unit (12), a barrel motor (1) and a drift conveyor comprising a barrel motor (1) of this type. A barrel motor (1) of this type comprises a barrel cover (10), a barrel motor drive unit (12), a first fastening element (13) and a second fastening element (14) for fastening the barrel motor (1) in a conveying frame, wherein the barrel cover (10) is mounted such that it can rotate about a barrel axis (101) at least relative to the first fastening element (13), wherein the barrel motor drive unit (12) comprises an electric motor (122) having a stator and a rotor and is arranged within the barrel cover (10), wherein the stator of the electric motor (122) is connected fixedly in terms of rotation to the first fastening element (13), wherein the rotor of the electric motor (122) is connected to the barrel cover (10) via an output element (128) in such a way that the barrel cover (10) can be driven via the output element (128) such that it can be rotated about the barrel axis (101) at least relative to the first fastening element (13), wherein the output element (128) is arranged on the same side of the barrel motor drive unit (12) as the first fastening element in relation to the barrel axis (101), and wherein the rotational axis of the output element (128) is not identical to the rotational axis of the rotor (125).

ABSTRACT

The invention relates to a barrel motor drive unit (12), a barrel motor (1) and a drift conveyor comprising a barrel motor (1) of this type. A barrel motor (1) of this type comprises a barrel cover (10), a barrel motor drive unit (12), a first fastening element (13) and a second fastening element (14) for fastening the barrel motor (1) in a conveying frame, wherein the barrel cover (10) is mounted such that it can rotate about a barrel axis (101) at least relative to the first fastening element (13), wherein the barrel motor drive unit (12) comprises an electric motor (122) having a stator and a rotor and is arranged within the barrel cover (10), wherein the stator of the electric motor (122) is connected fixedly in terms of rotation to the first fastening element (13), wherein the rotor of the electric motor (122) is connected to the barrel cover (10) via an output element (128) in such a way that the barrel cover (10) can be driven via the output element (128) such that it can be rotated about the barrel axis (101) at least relative to the first fastening element (13), wherein the output element (128) is arranged on the same side of the barrel motor drive unit (12) as the first fastening element in relation to the barrel axis (101), and wherein the rotational axis of the output element (128) is not identical to the rotational axis of the rotor (125).

Description

Barrel motor

Field of the invention

The invention relates to a barrel motor drive unit, to a barrel motor and to a drift conveyer having a barrel motor such as this.

Background to the invention and prior art

Various conveyer installations exist on which material being conveyed is transported on conveyer rollers. Some of the conveyer rollers such as these are driven.

Driven conveyer rollers such as these are described, for example, in US 6,402,653 B1 and EP 0 752 970 B1.

In general, conveyer rollers such as these have a continuous axle which comprises one or more parts and extends beyond the conveyer rollers at their ends. The conveyer rollers are mounted in the conveyer installation via the ends of an axle such as this.

Drives which are contained in such conveyor rollers are in general arranged concentrically about an axle such as this, that is to say the axle passes through the drive from one end to the other end. The known driven conveyer rollers generally have an element by means of which the drive force from the drive unit is transmitted circumferentially to the rotatable tube of the conveyer roller on which the material being conveyed runs.

In some cases, conveyer rollers such as these have a transmission which must be lubricated during operation. In order to ensure such lubrication, the interior of a

conveyor roller such as this is filled, for example, with oil up to a specific height.

Object

One object of the invention is to provide a drift conveyor having a barrel motor, a barrel motor such as this and a barrel motor drive unit for a barrel motor such as this, which can be produced easily and cheaply, and which can be maintained easily and at low cost during operation.

Achievement of the object

The object is achieved by the apparatuses and the method as claimed in the independent claims. Advantageous embodiments are disclosed in the dependent claims.

One aspect of the invention relates to a barrel motor comprising a barrel casing, a barrel motor drive unit, a first mounting element and a second mounting element for mounting the barrel motor in a conveyer frame, wherein the barrel casing is rotatably supported about a barrel axis at least relative to the first mounting element, wherein the barrel motor drive unit comprises an electric motor having a stator and a rotor, and is arranged within the barrel casing, wherein the stator of the electric motor is connected to the first mounting element such that they rotate together, wherein the rotor of the electric motor is connected to the barrel casing via an output drive element, such that the barrel casing can be driven via the output drive element at least relative to the first mounting element such that it can rotate about the barrel axis, wherein the output drive element is arranged on the same side of the barrel motor drive unit as the first mounting element, with respect to the barrel axis, and

wherein the rotation axis of the output drive element is not identical to the rotation axis of the rotor. This design has the advantage that all the parts of the barrel motor drive unit which have to transmit a torque can be arranged on one side of the barrel motor drive unit and that the output drive element need not rest circumferentially on the inner wall of the barrel casing but can specifically transmit a drive force to individual points on the barrel casing. This may be advantageous, for example, when a tooth system is provided between the barrel casing and the drive unit. Furthermore, a barrel motor such as this is simple to install, since the barrel motor drive unit can be introduced into the barrel casing from one side of the barrel casing such that, for example, the other side of the barrel motor can be provided in an already completely assembled form. For the purposes of this claim, the expression "such that they rotate together" means that a torque can be transmitted via a connection such as this in which the elements cannot rotate with respect to one another, and in which case the parts which are connected to one another essentially do not rotate with respect to one another. However, the expression is also intended to cover connections which, for example, have damping elements which allow the parts which are connected to one another to rotate through a few degrees.

A further advantageous embodiment relates to a barrel motor in which the rotation axis of the output drive element is not identical to the barrel axis. A barrel motor such as this has essentially the same advantages as the abovementioned barrel motor. Depending on the configuration of the barrel motor, it may be possible for the barrel axis not to correspond to the rotation axis of the rotor.

Furthermore, in one preferred embodiment of the barrel motor, the output drive element is a pinion which engages with an internal tooth system which is provided on the internal circumference of the barrel casing such that they rotate together. This has the advantage that higher drive forces can be transmitted via a tooth system than is the case with friction-locking connections. Furthermore, a tooth system can be arranged in a more space-saving manner, and is easier to assemble.

Furthermore, a barrel motor such as this preferably has a design in which a first roller bearing and/or a first fluid seal are/is provided between the barrel casing and the first mounting element. Preferred fluid seals are slide ring seals or shaft sealing rings which are available, for example, under the Simrit trademark.

Further advantageous aspects of an embodiment such as this may lie in a barrel motor in which the external radius of the first roller bearing and/or the external radius of the first fluid seal are/is essentially equal to or greater than a radius which extends from the barrel axis to the rotation axis of the output drive element, and/or is equal to or greater than the radius of the root circle of the internal tooth system, which is provided on the internal circumference of the barrel casing such that they rotate together. One advantage of this design is that roller bearings having a relatively large diameter can also absorb more load, as a result of which heavier loads can be transported on a barrel motor such as this, and/or that a barrel motor such as this can also be used in conjunction with a belt, since bearings designed in this way can also absorb a belt stress. It should also be noted that, when roller bearings are chosen in this way, the internal diameter is also relatively large. The first mounting element in the case of an embodiment which is designed

advantageously in this way therefore preferably has a relatively large external diameter which corresponds to the internal diameter of a roller bearing such as this. A relatively large diameter such as this of the first mounting element makes it possible to provide different functional elements in the radial cross section of the mounting element, for example cables with relatively large cross sections, more cables than normal, specifically for example for open-loop and closed-loop control of additional functions (for example brakes, rotation sensors etc.), plug sockets for connection, which are preferably sealed, oil filling holes, threaded holes for mounting the mounting element on an adjacent frame of a drift conveyer. It is also possible for a first mounting element such as this to be designed such that it ends essentially flush with the axial rim of the barrel casing, or projects only slightly beyond the axial rim of the barrel casing. This allows the barrel motor to have a compact form. The installed length of the barrel motor can thus be reduced to a minimum. The barrel motor can be fitted in a sheet-metal conveyer frame using standard parts by means of the threaded holes, which can be incorporated easily. This preferred embodiment ensures optimized assembly and dismantling in the conveyer, and there is no restriction to the connection options.

A barrel motor such as this is preferable, in which the first roller bearing has an external diameter which is essentially equal to or greater than the diameter of the barrel motor drive unit. The advantage in this case is that the barrel motor drive unit can be pushed into the barrel casing with the roller bearing and/or the fluid seal removed. In this context, it is likewise preferable for the crown circle of the tooth system therefore to have a diameter, which is formed by the uppermost peaks of the internal tooth system, which is likewise equal to or greater than the external diameter

of the barrel drive unit. In another preferred embodiment, the barrel motor drive unit has an external diameter which is slightly smaller than the internal diameter of the barrel casing in the area in which the barrel motor drive unit is arranged in the barrel casing when in the assembled state. The external diameter of the barrel motor drive unit is preferably about one to two millimeters less than the internal diameter of the barrel casing. In this design, the internal area in the barrel casing could be optimally utilized, thus making it possible to use a barrel motor drive unit of maximum power. In this case, a first bearing unit, which comprises the internal tooth system, the first roller bearing and the first fluid seal, could be installed together with the barrel motor drive unit.

A barrel motor such as this preferably has a design in which an axle element which is essentially concentric with the barrel axis is provided between the barrel motor drive unit and the mounting element and fixes the stator of the electric motor by means of the mounting element in a blind hole of the mounting element, such that they rotate together. A concentric axle element such as this is preferably formed like a pin and/or to be cylindrical, and preferably has a diameter which is equal to or less than the difference between the length of a radius from the barrel axis to the rotation axis of the output drive element and the radius of the output drive element, that is to say in the case of a pinion its crown circle. A design such as this allows the concentric axle element and the output drive element to be provided alongside one another without the rotating output drive element sliding on the axle element. A cylindrical axle element such as this can easily be fixed in or connected in the blind hole of the first mounting element. A connection such that they rotate together can be provided via any desired shaft-

hub connections, preferably for example via an adjusting spring.

A further advantageous embodiment relates to a barrel motor in which a cable opening, in particular for the electrical supply for the electric motor, and/or a plug socket and/or an oil filling opening are/is provided in the mounting element. A design such as this has the advantage that a barrel motor such as this can easily be assembled and maintained since not only is it possible to easily produce a plug connection, but the accessibility to the oil filling opening is also ensured.

In a further preferred embodiment of the barrel motor, the barrel drive unit and the barrel casing are supported via a first bearing and a center bearing such that they can rotate with respect to one another and cannot tilt with respect to one another, wherein the center bearing is at a distance from the first bearing in the direction of the barrel axis, wherein, viewed from the first bearing in the direction of the barrel axis, a second bearing is provided behind the center bearing, via which second bearing the barrel casing is rotatably supported with respect to a conveyer frame, which is adjacent to the barrel motor, wherein the barrel drive unit is supported with respect to the barrel casing independently of the second bearing. A bearing such as this has the advantage that there is no need to provide an axle which extends from one end of the barrel motor to the other end and bears the barrel motor drive unit within the barrel casing. Furthermore, this design has the advantage that slight bending of the barrel casing under load does not lead to tilting of the barrel motor drive unit with respect to the barrel casing. A further advantage is that center bearing such as this leads to the barrel casing being reinforced and made robust.

Furthermore, a barrel motor such as this preferably has a design in which the first bearing comprises the first roller bearing. A design such as this renders an additional bearing superfluous.

Further advantageous aspects of an embodiment such as this may lie in a barrel motor in which the second bearing comprises a second roller bearing in the area of the second mounting element.

A barrel motor such as this in which a center seal is provided between the first fluid seal and the second bearing such that a fluid-tight space, which accommodates at least a portion of the barrel motor drive unit, is formed between the first seal and the second bearing in the interior of the barrel motor is preferred. This design results in an advantageous configuration in which different barrel motors with different barrel casing lengths have a fluid-tight space on sides of the barrel motor drive unit, which area is essentially of the same size in all the different barrel motors. If oil lubrication is required in a barrel motor such as this, this would ensure that the same amount of oil would be required to fill the fluid-tight space in each of the different barrel motors. The required amount of oil is less for barrel motors with longer physical lengths than in the case of conventional barrel motors, which means that oil can be saved.

A barrel motor such as this preferably has a design in which the center seal comprises a sealing trough whose rim is formed by a tubular section which is cylindrical in places and whose external diameter corresponds essentially to the internal diameter of the barrel casing. A center seal such as this could preferably have a circumferential groove on the outside of the

cylindrical tubular section, in which groove an O-ring is inserted which provides a seal between the sealing trough and the barrel casing. Alternatively, an interference fit could also be provided between the barrel casing and the sealing trough, designed and/or of such a size that, at the same time, it has a sealing and power-transmitting function. As an alternative to the sealing trough, it would also be possible to provide a sealing roller bearing, for example a grooved ball bearing, whose outer ring is fitted into the barrel casing. It is also feasible for a shaft sealing ring or a similar sealing element to be provided in addition to a grooved ball bearing. In comparison to these alternative solutions, the solution with the sealing trough has the advantage that the sealing trough can be produced easily, for example by the injection-molding process. Furthermore, a sealing trough such as this serves to reinforce the barrel casing in the internal area.

A further advantageous embodiment relates to a barrel motor in which the center bearing comprises a central roller bearing which is arranged between the barrel motor drive unit and the barrel casing, in particular between the barrel motor drive unit and an inner surface of the cylindrical tubular section of the sealing trough. A design such as this makes it easier to assemble the barrel motor drive unit together with a roller bearing and the sealing trough in the barrel motor. Furthermore, a bearing surface can be produced more easily on the inner surface of the sealing trough than in the internal area of the barrel casing.

A further aspect of the invention relates to a barrel motor comprising a barrel casing, a barrel motor drive unit, a first mounting element and a second mounting element for mounting the barrel motor in a conveyer frame, wherein the barrel casing is rotatably supported

about a barrel axis at least relative to the first mounting element, wherein the barrel motor drive unit comprises an electric motor having a stator and a rotor, and is arranged within the barrel casing, wherein the stator of the electric motor is connected to the first mounting element such that they rotate together, wherein the barrel drive unit and the barrel casing are supported via a first bearing and a center bearing such that they can rotate with respect to one another and cannot tilt with respect to one another, wherein the center bearing is at a distance from the first bearing in the direction of the barrel axis, wherein, viewed from the first bearing in the direction of the barrel axis, a second bearing is provided behind the center bearing, via which second bearing the barrel casing is rotatably supported with respect to a conveyer frame, which is adjacent to the barrel motor, and wherein the barrel drive unit is supported with respect to the barrel casing independently of the second bearing. The statements that have been made above with respect to the first aspect of the invention apply essentially to this further aspect of the invention. As above as well, the bearing of the barrel motor drive unit in the barrel casing on the side of the unit facing away from the first mounting element has the advantage that, even if the second bearing were to be removed, the barrel motor drive unit would still be supported such that it cannot tilt with respect to the barrel casing. There is therefore no need for any additional bearing for the barrel motor drive unit, for example via a continuous axle or an axle of the barrel motor drive unit, which also extends on the side of the barrel motor drive unit facing away from the first mounting element. Inter alia, this also has the advantage that a continuous axle such as this, which would be dependent on the length of the barrel casing and would therefore have to be manufactured as an extra item for each barrel length, is not required. The

alternatives and advantages mentioned with reference to the embodiments described above also apply to the advantageous embodiments described in the following text.

Furthermore, in one preferred embodiment of the barrel motor, the first bearing is arranged between the first mounting element and the barrel casing and comprises a first roller bearing and/or a first fluid seal.

Furthermore, a barrel motor such as this preferably has a design in which the second bearing is arranged between the second mounting element and the barrel casing, and comprises a second roller bearing and/or a second fluid seal.

Further advantageous aspects of an embodiment such as this may lie in a barrel motor in which a center seal is provided between the first fluid seal and the second bearing such that a fluid-tight space, which accommodates at least a portion of the barrel motor drive, is formed between the first seal and the second bearing in the interior of the barrel motor.

A barrel motor such as this is preferable in which the center seal comprises a sealing trough whose rim is formed by a tubular section which is cylindrical in places and whose external diameter corresponds essentially to the internal diameter of the barrel casing.

A barrel motor such as this preferably has a design in which the rotor of the electric motor is connected to the barrel casing via an output drive element, such that the barrel casing can be driven via the output drive element at least relative to the first mounting element, such that it can rotate about the barrel axis, wherein the output drive element is arranged on the

same side of the barrel motor drive unit as the first mounting element with respect to the barrel axis, and wherein the rotation axis of the output drive element is not identical to the rotation axis of the rotor.

A further advantageous embodiment relates to a barrel motor in which the rotation axis of the output drive element is not identical to the barrel axis.

In a further preferred embodiment of the barrel motor, the output drive element is a pinion which engages with an internal tooth system which is provided on the internal circumference of the barrel casing such that they rotate together.

Furthermore, a barrel motor such as this preferably has a design in which the external radius of the first roller bearing and/or the external radius of the first fluid seal are/is essentially equal to or greater than a radius which extends from the barrel axis to the rotation axis of the output drive element, and/or is equal to or greater than the radius of the root circle of the internal tooth system, which is provided on the internal circumference of the barrel casing such that they rotate together.

Further advantageous aspects of an embodiment such as this may lie in a barrel motor in which the first roller bearing has an external diameter which is essentially equal to or greater than the diameter of the barrel motor drive unit.

In one preferred barrel motor such as this, an axle element which is essentially concentric with the barrel axis is provided between the barrel motor drive unit and the mounting element and fixes or connects the stator of the electric motor by means of the mounting

element in a blind hole of the mounting element, such that they rotate together.

A barrel motor such as this preferably has a design in which a cable opening, in particular for the electrical supply for the electric motor, and/or a plug socket and/or an oil filling opening are/is provided in the mounting element.

A further advantageous embodiment relates to a barrel motor in which the center bearing comprises a central roller bearing which is arranged between the barrel motor drive unit and the barrel casing, in particular between the barrel motor drive unit and an inner surface of the cylindrical tubular section of the sealing trough.

A further aspect of the invention relates to a drift conveyer having a barrel motor as claimed in one of claims 1 to 27.

A further aspect of the invention relates to a barrel motor drive unit comprising an axle element, an electric motor having a stator and a rotor, a transmission having a drive element and having an output drive element, wherein the axle element is arranged such that it rotates together with the stator of the electric motor and is passed out of the barrel motor drive unit on a first side of the barrel motor drive unit, wherein the output drive element is passed out of the barrel motor drive unit on the side of the axle element, and wherein the rotation axis of the output drive element is arranged offset with respect to the axle element.

A further aspect of the invention relates to a barrel motor comprising a barrel casing, a barrel motor drive unit, a first mounting element and a second mounting element for mounting the barrel motor in a conveyer

frame, a bearing for mounting the barrel casing on the mounting elements, and at least one axle element which is used as a connecting element between the barrel motor drive unit and at least one of the mounting elements, wherein all said components of the barrel motor apart from the barrel casing are designed such that they can be used in an identical manner in barrel motors with different casing lengths, in such a way that the only length-dependent part of the barrel motor is the barrel casing. Only the most important parts which a barrel motor such as this comprises have been mentioned in this context. It is feasible for a barrel motor such as this to comprise further parts, in particular those parts that have been described with reference to the other aspects of the invention. In particular, parts such as these may also be "said components" in the sense of this aspect of the invention. A barrel motor such as this has the advantage that barrel motors of different lengths can be produced easily, since most of the components for barrel motors, which each have different lengths, are identical. It is particularly preferable for only a single part, in particular the barrel casing, to have to be produced as a function of the length in a barrel motor such as this.

Individual particularly preferred embodiments of the invention will be described by way of example in the following text. In this case, the individual described embodiments in some cases have features which are not absolutely essential in order to implement the present invention but which are in general considered to be preferable. For example, embodiments which do not have all the features of the embodiments described in the following text are also considered to have been disclosed within the teaching of the invention. It is likewise feasible for features which are described with

reference to different embodiments to be selectively combined with one another.

Brief description of the drawings

In the figures:

Figure 1 shows a longitudinal section through one preferred embodiment of a barrel motor according to the invention, and a side view of the barrel motor, and

Figure 2a and figure 2b
show enlargements of details from the longitudinal section from figure 1.

Detailed description of the drawing

Figure 1 shows a longitudinal section through one preferred embodiment of a barrel motor according to the invention, and a side view of the barrel motor.

The figure shows a barrel motor 1 which has a barrel casing 10, a first mounting element 13, a second mounting element 14 and a barrel motor drive unit 12.

The barrel casing 10 can rotate about the mounting elements 13, 14. This is ensured by means of a first roller bearing 136 in the area of a first bearing 135, and by means of a second roller bearing 142 in the area of a second bearing 141, which bearings bear the barrel casing on the first mounting element 13 and the second mounting element 14. The first bearing 135 furthermore comprises a first fluid seal 137, and the second bearing 141 furthermore comprises a second fluid seal 143. These fluid seals ensure that no moisture can enter the barrel motor 1 from the outside. On the other hand, the fluid seal 137 ensures that oil which is

located in a fluid-tight space 16 cannot escape out of the barrel motor to the outside.

The oil level HÖ in the internal area 16 is designed on the one hand to ensure lubrication of the first roller bearing and of the central roller bearing, and on the other hand to ensure adequate cooling of the barrel motor drive unit. This is a further advantage of the design with roller bearings with a large diameter, on the basis of which a relatively low filling height of the oil, that is to say a low oil level HÖ, is sufficient to lubricate the roller bearings.

In addition to the two said fluid seals 137, 143 in this preferred embodiment, sealing elements are furthermore arranged axially outside the respective fluid seals, and each, together with the first and the second mounting element 13, 14, form a labyrinth seal. In this case, the sealing elements are preferably introduced into the barrel casing to be fluid-tight, preferably by pressing them and/or adhesively bonding them in. This has the advantage that, when the lower edge of the internal diameter of the sealing element is above the oil level HÖ in the internal area 16, no oil can escape from the internal area 16 even if one of the fluid seals is leaking. The low oil level HÖ which this design allows nevertheless results in a comparatively large internal diameter of the sealing element, as a result of which the diameter of that area of the mounting element 13 which is passed out of the sealing element can also be made large, offering sufficient space for implementation of wiring, etc.

As can be seen in figure 1, the mounting elements 13, 14 have a relatively large diameter. This ensures that these mounting elements, in particular the first mounting element 131, can provide an oil filling opening 134, a cable opening 132 which is preferably

provided with a plug socket 133, and threaded holes, via which the mounting element can be mounted on an adjacent bearing frame.

In this embodiment, said threaded holes in particular allow a barrel motor 1 according to the invention to be easily fitted in a frame of a drift conveyer. Other mounting apparatuses can also be provided instead of threaded holes such as these. By way of example, a single threaded hole is illustrated for the second mounting element 14. It would also be feasible, for example, to provide a single blind hole or just one rest on a frame of the drift conveyer for the (second) mounting element 14 and a fixing in the frame longitudinal direction. In this context, it is preferable if a fitting on the bearing frame is ensured at least on the side of the first mounting element 13, which fitting prevents rotation of the first mounting element, thus allowing the drive torque to be transmitted to the frame.

Since, in the illustrated embodiment, no torque is transmitted via the second mounting element 14, it is not absolutely essential to provide a connection such that the elements rotate together such as this on the side of the second mounting element. This also applies to an oil filling opening 134, a cable opening 132 etc., in a corresponding manner, which can be provided on the second mounting element, but are not required at these points for the purposes of the described embodiment.

It is preferable for at least one of the mounting elements to be designed such that alignment, parallelity and angle errors can be compensated for. This could be done, for example, by means of a rubber bearing and/or by means of elongated holes on the frame, by which means the barrel motor can first of all

be aligned in the frame and can then be fixed by tightening the screws in the elongated holes.

The barrel motor drive unit 12 illustrated in figure 1 comprises an electric motor 122 and a transmission 126. The electric motor 122 has a stator and a rotor, which are not illustrated in any more detail in the figures. The transmission is connected to the motor output drive via a drive element which is not illustrated, and converts the motor rotation speed to an output drive rotation speed which is produced on an output drive element 128 of the transmission 126.

The output drive element 128 is in the form of a pinion in this preferred embodiment. The pinion engages with an internal tooth system 102 which is provided on the internal circumference of the barrel casing 10. The internal tooth system 102 is provided in the illustrated embodiment on a ring element, which also has a sealing surface for the first fluid seal 137 and a bearing surface for the first roller bearing 136. The ring element is pressed into the barrel casing 10 and is preferably produced by the injection-molding process. Where relatively high torque levels have to be transmitted, the ring element can also be provided as a die-cast aluminum part. Other production methods are likewise feasible. The ring element can be pressed, adhesively bonded and/or welded into the barrel casing, depending on the materials used. Other mounting methods are likewise feasible. The crown circle, that is to say the diameter which is defined by the points of the internal tooth system which are located radially furthest inwards, is, in the illustrated embodiment, equal to or greater than the diameter DT of the barrel motor drive unit 12 at its thickest point. The barrel motor drive unit 12 can therefore be pushed into the barrel casing once the ring element has already been preinstalled.

On the side of the barrel motor drive unit 12 which is opposite the first mounting element 13, the barrel motor drive unit 12 is supported in the barrel casing 10 via a center bearing 15. The center bearing 15 comprises a sealing trough 151 and a central roller bearing 154. The sealing trough 151 is essentially in the form of a saucer. Its rim is cylindrical and is pressed into the barrel casing 10. In the illustrated embodiment, the fit with which the sealing trough 151 is pressed into the barrel casing 10 is chosen such that the sealing trough 151 and the barrel casing 10 are sealed against fluids, in particular lubricating oil.

The central roller bearing 154 is supported on the inner surface of the cylindrical tubular section 152 of the sealing trough 151. The rear face of the barrel motor drive unit 12, which is preferably designed to be concentric with the barrel casing 10 at least in this area, is supported via the central roller bearing 154 in the barrel casing 10 such that it can rotate.

As an alternative to this embodiment, it would be feasible to provide a bearing and a sealing surface on the surface of the barrel motor drive unit 12, in such a way that the center bearing and seal are not provided at the axial end of the barrel motor drive unit 12, but further in the direction of the first mounting element.

Since, apart from the barrel casing 10, the same parts can be used in every barrel motor 1, depending on the dimensions of the barrel motor drive unit 12, these parts can be produced particularly advantageously. Furthermore, the fluid-tight space 16 which is formed between the first mounting element 13, the sealing trough 151 and the barrel casing 10 is always of the same size in barrel motors such as these. In

consequence, the same amount of oil is always required, and is introduced in order to lubricate the pinion and internal tooth system, and/or transmission 126. The oil filling level in figure 2a is indicated by the reference symbol HÖ.

Figures 2a and 2b show enlargements of details from the longitudinal section from figure 1.

Figure 2a shows an enlargement of the area of the barrel motor 1, in the area of the first mounting element 13. Those parts which revolve around the barrel axis 101 are indicated by cross-shading. The illustration shows, inter alia, various radii and diameters. The reference symbol RF denotes the radius between the barrel axis 101 and the root circle of the internal tooth system 102. The root circle is the circle of a tooth system which runs through the deepest points at the tooth base between in each case two teeth.

The radius which extends from the barrel axis 101 to the rotation axis of the output drive element 129 is annotated with the reference symbol RA. Since the output drive element 128 can be located behind the plane of the drawing in the illustrated embodiment, this radius may be greater than that illustrated in the projection.

Figure 2b shows an enlargement of the area of the center bearing 15 from figure 1. This shows well that the barrel casing is formed with different diameters which form a step in the area of the center bearing. The sealing trough 151 is pushed onto this step and is fixed thereby axially in the direction of the second mounting element.

List of reference symbols

1	Barrel motor
10	Barrel casing
101	Barrel axis
102	Internal tooth system
12	Barrel motor drive unit
121	Concentric axle element
122	Electric motor
125	Rotation axis of the rotor
126	Transmission
128	Output drive element
129	Rotation axis of the output drive element
13	First mounting element
131	Blind hole
132	Cable opening
133	Plug socket
134	Oil filling opening
135	First bearing
136	First roller bearing
137	First fluid seal
14	Second mounting element
141	Second bearing
142	Second roller bearing
143	Second fluid seal
15	Center bearing
151	Sealing trough
152	Cylindrical tubular section
153	Inner surface of the cylindrical tubular section of the sealing trough
154	Central roller bearing
155	Center seal

16 Fluid-tight space

2 Conveyer frame

R1 External radius of the first roller bearing

RA Radius which extends from the barrel axis to the rotation axis of the output drive element

RF Radius of the root circle of the internal tooth system

RT Radius of the barrel motor drive unit

DT Diameter of the barrel motor drive unit

HÖ Oil level

Patent Claims

1. A barrel motor (1) comprising a barrel casing (10), a barrel motor drive unit (12), a first mounting element (13) and a second mounting element (14) for mounting the barrel motor (1) in a conveyer frame,

wherein the barrel casing (10) is rotatably supported about a barrel axis (101) at least relative to the first mounting element (13),

wherein the barrel motor drive unit (12) comprises an electric motor (122) having a stator and a rotor, and is arranged within the barrel casing (10),

wherein the stator of the electric motor (122) is connected to the first mounting element (13) such that they rotate together,

wherein the rotor of the electric motor (122) is connected to the barrel casing (10) via an output drive element (128), such that the barrel casing (10) can be driven via the output drive element (128) at least relative to the first mounting element (13) such that it can rotate about the barrel axis (101),

wherein the output drive element (128) is arranged on the same side of the barrel motor drive unit (12) as the first mounting element (13), with respect to the barrel axis (101),

and wherein the rotation axis of the output drive element (129) is not identical to the rotation axis of the rotor (125).

2. The barrel motor (1) as claimed in claim 1, wherein the rotation axis of the output drive element (129) is not identical to the barrel axis (101).

3. The barrel motor (1) as claimed in one of the preceding claims, wherein the output drive element (128) is a pinion which engages with an internal tooth system which is provided on the internal circumference of the barrel casing (10) such that they rotate together.

4. The barrel motor (1) as claimed in one of the preceding claims, wherein a first roller bearing (136) and/or a first fluid seal (137) are/is provided between the barrel casing (10) and the first mounting element (13).

5. The barrel motor (1) as claimed in claim 4, wherein the external radius of the first roller bearing (136) and/or the external radius of the first fluid seal (137) are/is essentially equal to or greater than a radius which extends from the barrel axis (101) to the rotation axis of the output drive element (129), and/or is equal to or greater than the radius of the root circle of the internal tooth system, which is provided on the internal circumference of the barrel casing (10) such that they rotate together.

6. The barrel motor (1) as claimed in one of the preceding claims, wherein the first roller bearing (136) has an external diameter which is essentially equal to or greater than the diameter of the barrel motor drive unit (12).

7. The barrel motor (1) as claimed in one of the preceding claims, wherein an axle element (121) which is essentially concentric with the barrel axis (101) is provided between the barrel motor drive unit (12) and the mounting element and fixes the stator of the electric motor (122) by means of the first mounting

element (13) in a blind hole (131) of the first mounting element (13), such that they rotate together.

8. The barrel motor (1) as claimed in one of the preceding claims, wherein a cable opening (132), in particular for the electrical supply for the electric motor (122), and/or a plug socket (133) and/or an oil filling opening (134) are/is provided in the first mounting element (13).

9. The barrel motor (1) as claimed in one of the preceding claims, wherein the barrel drive unit and the barrel casing (10) are supported via a first bearing (135) and a center bearing such that they can rotate with respect to one another and cannot tilt with respect to one another,

wherein the center bearing is at a distance from the first bearing (135) in the direction of the barrel axis (101),

wherein, viewed from the first bearing (135) in the direction of the barrel axis (101), a second bearing (141) is provided behind the center bearing, via which second bearing (141) the barrel casing (10) is rotatably supported with respect to a conveyer frame, which is adjacent to the barrel motor (1), and

wherein the barrel drive unit is supported with respect to the barrel casing (10) independently of the second bearing (141).

10. The barrel motor (1) as claimed in claim 9, wherein the first bearing (135) comprises the first roller bearing (136).

11. The barrel motor (1) as claimed in claim 9 or 10, wherein the second bearing (141) comprises a second

roller bearing (142) in the area of the second mounting element (14).

12. The barrel motor (1) as claimed in one of claims 4 to 11, wherein a center seal (155) is provided between the first fluid seal (137) and the second bearing (141) such that a fluid-tight space (16), which accommodates at least a portion of the barrel motor drive, is formed between the first seal and the second bearing (141) in the interior of the barrel motor (1).

13. The barrel motor (1) as claimed in claim 11, wherein the center seal (155) comprises a sealing trough (151) whose rim is formed by a tubular section (152) which is cylindrical at least in places and whose external diameter corresponds essentially to the internal diameter of the barrel casing (10).

14. The barrel motor (1) as claimed in one of claims 12 or 13, in which the center bearing comprises a central roller bearing (154) which is arranged between the barrel motor drive unit (12) and the barrel casing (10), in particular between the barrel motor drive unit (12) and an inner surface (153) of the cylindrical tubular section (152) of the sealing trough (151).

15. A barrel motor (1) comprising a barrel casing (10), a barrel motor drive unit (12), a first mounting element (13) and a second mounting element (14) for mounting the barrel motor (1) in a conveyer frame,

wherein the barrel casing (10) is rotatably supported about a barrel axis (101) at least relative to the first mounting element (13),

wherein the barrel motor drive unit (12) comprises an electric motor (122) having a stator and a rotor, and is arranged within the barrel casing (10),

wherein the stator of the electric motor (122) is connected to the first mounting element (13) such that they rotate together,

wherein the barrel drive unit and the barrel casing (10) are supported via a first bearing (135) and a center bearing such that they can rotate with respect to one another and cannot tilt with respect to one another,

wherein the center bearing is at a distance from the first bearing (135) in the direction of the barrel axis (101),

wherein, viewed from the first bearing (135) in the direction of the barrel axis (101), a second bearing (141) is provided behind the center bearing, via which second bearing (141) the barrel casing (10) is rotatably supported with respect to a conveyer frame, which is adjacent to the barrel motor (1),

wherein the barrel drive unit is supported with respect to the barrel casing (10) independently of the second bearing (141).

16. The barrel motor (1) as claimed in claim 15, wherein the first bearing (135) is arranged between the first mounting element (13) and the barrel casing (10) and comprises a first roller bearing (136) and/or a first fluid seal (137).

17. The barrel motor (1) as claimed in claim 15 or 16, wherein the second bearing (141) is arranged between the second mounting element (14) and the barrel casing (10), and comprises a second roller bearing (142) and/or a second fluid seal (143).

18. The barrel motor (1) as claimed in one of claims 15 to 17, wherein a center seal (155) is provided between the first fluid seal (137) and the second bearing (141) such that a fluid-tight space (16), which accommodates at least a portion of the barrel motor drive, is formed between the first seal and the second bearing (141) in the interior of the barrel motor (1).

19. The barrel motor (1) as claimed in claim 18, wherein the center seal (155) comprises a sealing trough (151) whose rim is formed by a tubular section (152) which is cylindrical at least in places and whose external diameter corresponds essentially to the internal diameter of the barrel casing (10).

20. The barrel motor (1) as claimed in one of claims 15 to 19, wherein the rotor of the electric motor (122) is connected to the barrel casing (10) via an output drive element (128), such that the barrel casing (10) can be driven via the output drive element (128) at least relative to the first mounting element (13), such that it can rotate about the barrel axis (101),

wherein the output drive element (128) is arranged on the same side of the barrel motor drive unit (12) as the first mounting element (13) with respect to the barrel axis (101),

and wherein the rotation axis of the output drive element (129) is not identical to the rotation axis of the rotor (125).

21. The barrel motor (1) as claimed in claim 20, wherein the rotation axis of the output drive element (129) is not identical to the barrel axis (101).

22. The barrel motor (1) as claimed in one of claims 20 or 21, wherein the output drive element (128) is a

pinion which engages with an internal tooth system which is provided on the internal circumference of the barrel casing (10) such that they rotate together.

23. The barrel motor (1) as claimed in one of claims 20 or 22, wherein the external radius of the first roller bearing (136) and/or the external radius of the first fluid seal (137) are/is essentially equal to or greater than a radius which extends from the barrel axis (101) to the rotation axis of the output drive element (129), and/or is equal to or greater than the radius of the root circle of the internal tooth system, which is provided on the internal circumference of the barrel casing (10) such that they rotate together.

24. The barrel motor (1) as claimed in one of claims 16 to 23, wherein the first roller bearing (136) has an external diameter which is essentially equal to or greater than the diameter of the barrel motor drive unit (12).

25. The barrel motor (1) as claimed in one of claims 15 to 24, wherein an axle element (121) which is essentially concentric with the barrel axis (101) is provided between the barrel motor drive unit (12) and the first mounting element (13) and fixes the stator of the electric motor (122) by means of the first mounting element (13) in a blind hole (131) of the first mounting element (13), such that they can rotate together.

26. The barrel motor (1) as claimed in one of claims 15 to 25, wherein a cable opening (132), in particular for the electrical supply for the electric motor (122), and/or a plug socket (133) and/or an oil filling opening (134) are/is provided in the first mounting element (13).

27. The barrel motor (1) as claimed in one of claims 15 to 26, in which the center bearing comprises a central roller bearing (154) which is arranged between the barrel motor drive unit (12) and the barrel casing (10), in particular between the barrel motor drive unit (12) and an inner surface (153) of the cylindrical tubular section (152) of the sealing trough (151).

28. A drift conveyer having a barrel motor (1) as claimed in one of claims 1 to 27.

29. A barrel motor drive unit (12) comprising an axle element (121), an electric motor (122) having a stator and a rotor, a transmission (126) having a drive element and having an output drive element (128),

wherein the axle element (121) is arranged such that it rotates together with the stator of the electric motor (122) and is passed out of the barrel motor drive unit (12) on a first side of the barrel motor drive unit (12),

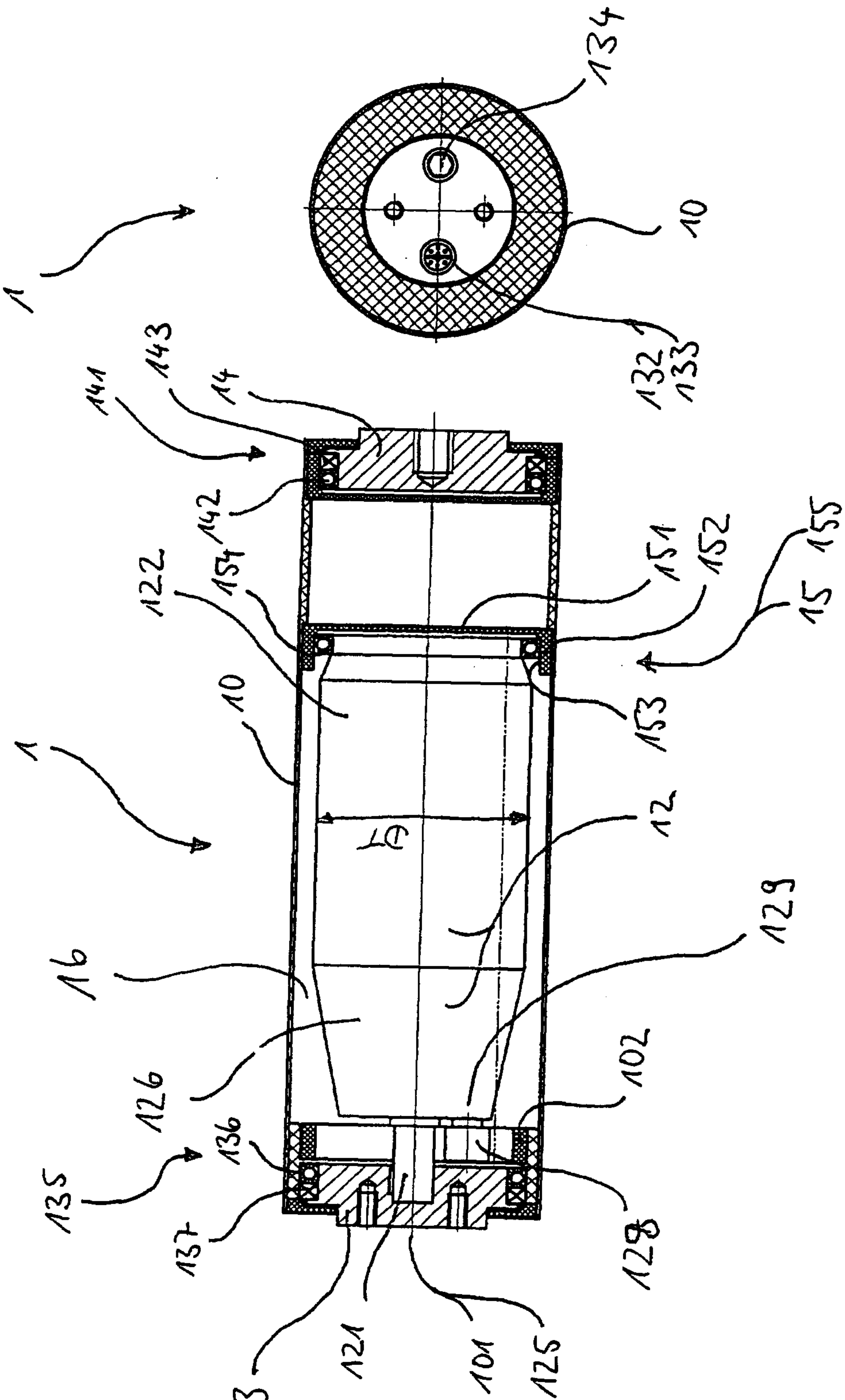
wherein the output drive element (128) is passed out of the barrel motor drive unit (12) on the side of the axle element (121), and

wherein the rotation axis of the output drive element is arranged offset with respect to the axle element (121).

30. A barrel motor (1) comprising a barrel casing (10), a barrel motor drive unit (12), a first mounting element (13) and a second mounting element (14) for mounting the barrel motor (1) in a conveyer frame, a bearing for supporting the barrel casing (10) on the mounting elements, and at least one axle element (121) which is used as a connecting element between the

barrel motor drive unit (12) and at least one of the mounting elements,

wherein all said components of the barrel motor (1) apart from the barrel casing (10) are designed such that they can be used in an identical manner in barrel motors with different casing lengths, in such a way that the only length-dependent part of the barrel motor (1) is the barrel casing (10).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143
14
142
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122
151
152
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153
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12
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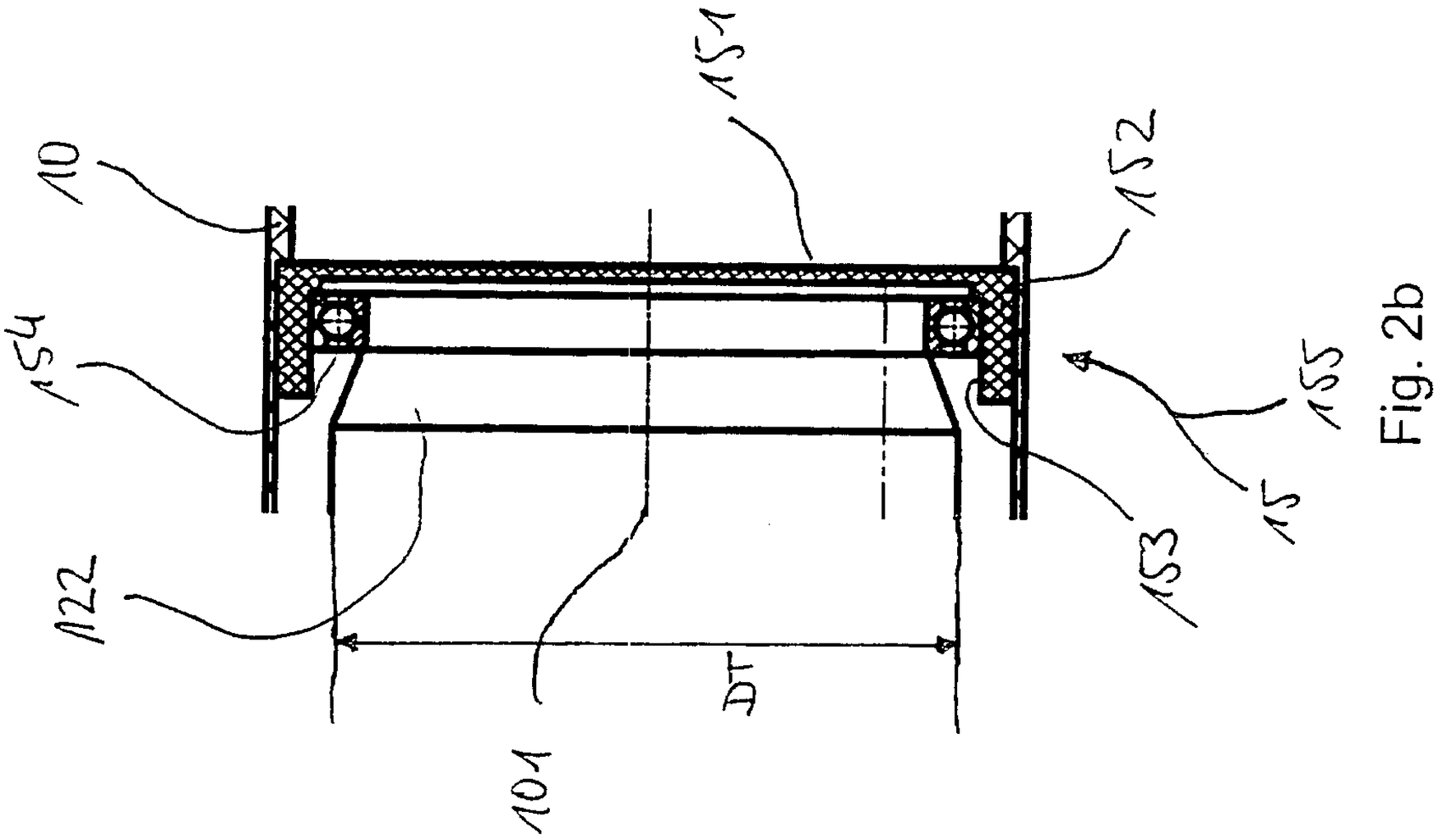
136
135
137
128
13
121
101
125

Fig.1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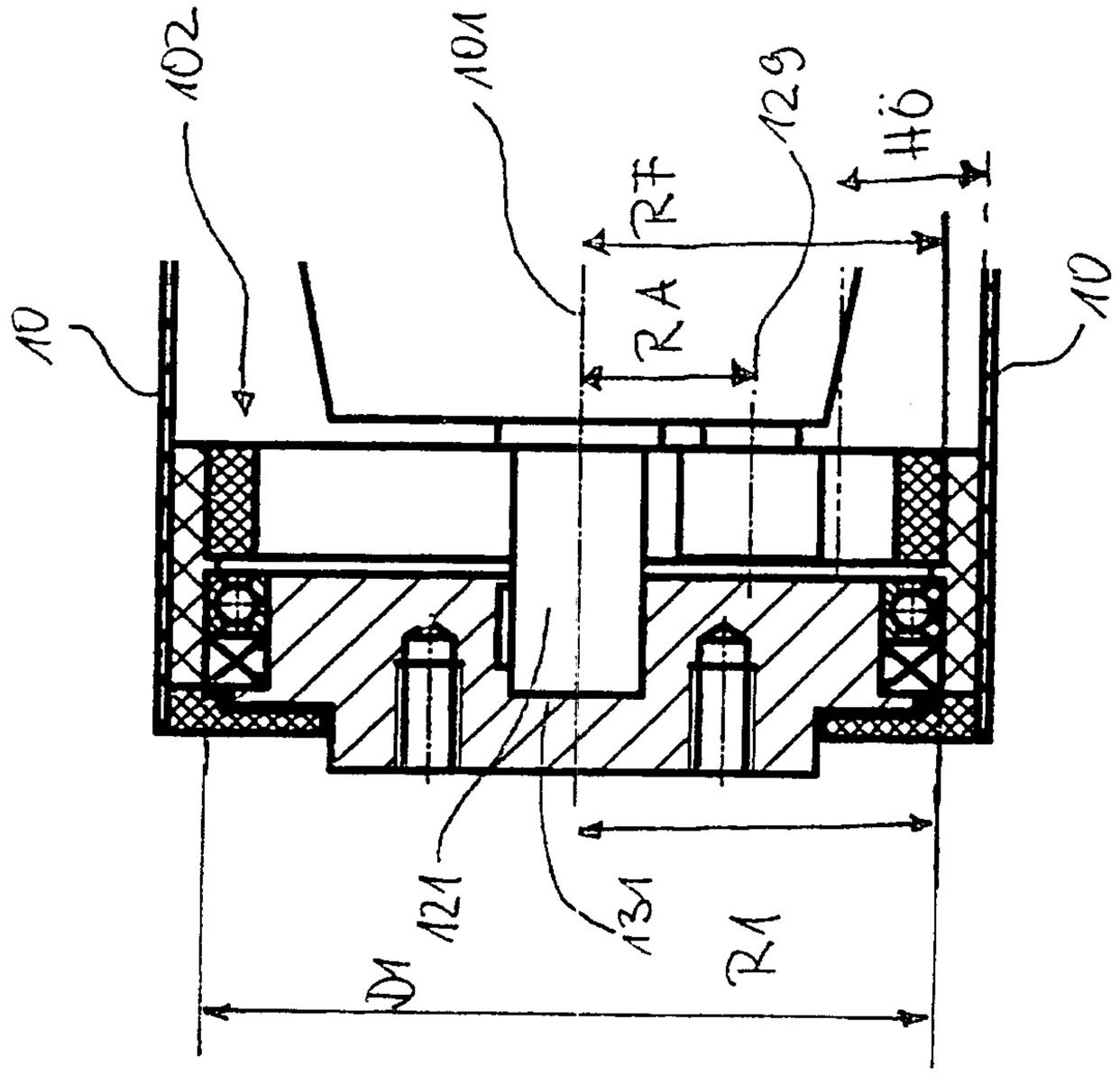
152
154
155
153
15
122
101
DT

Fig. 2b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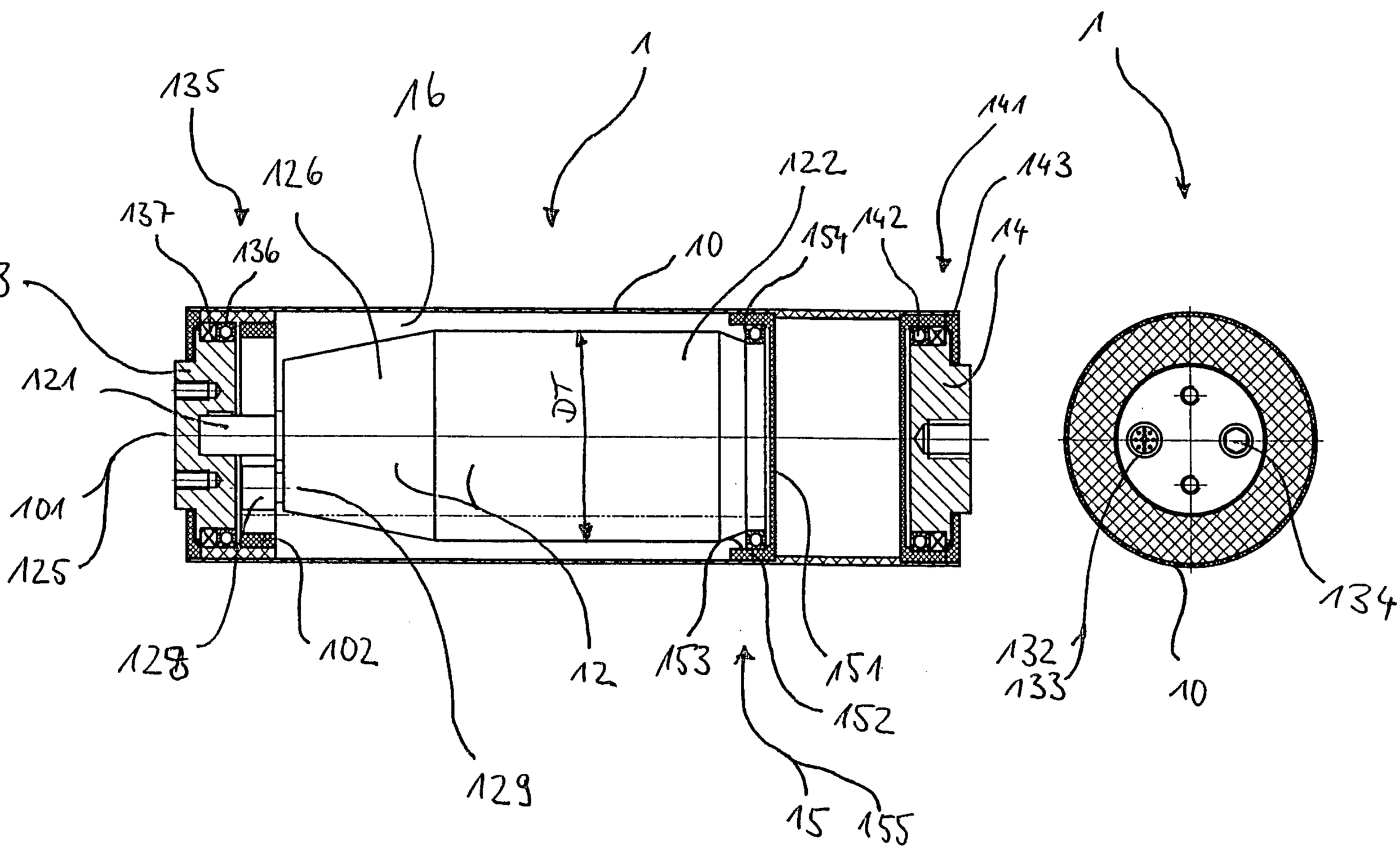
101
129
46
RF
RA
10
D1
121
131
R1

Fig. 2a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