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(54) **ROTOR CLEANING DEVICE OF AN OPEN-END TYPE SPINNING APPARATUS, AN AUXILIARY CARRIAGE OF AN OPEN-END TYPE SPINNING APPARATUS AND CORRESPONDING OPEN-END TYPE SPINNING APPARATUS**

ROTORREINIGUNGSVORRICHTUNG EINER OFFENEND-SPINNVORRICHTUNG, HILFSWAGEN EINER OFFENEND-SPINNVORRICHTUNG UND ZUGEHÖRIGE OFFENEND-SPINNVORRICHTUNG

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Description

FIELD OF APPLICATION

[0001] The present invention relates to a rotor cleaning device of an open-end type spinning apparatus, an auxiliary carriage of an open-end type spinning apparatus and relative open-end type spinning apparatus.

PRIOR ART

[0002] As is known, the cleaning of the rotor of an open-end spinning apparatus is carried out in two typical circumstances, that is, when the quality of the yarn falls below a certain predetermined level, or whenever there is a break in the yarn in production.

[0003] In both the aforementioned cases, the spinning unit is stopped and, before starting again, the spinning condition is also restored by cleaning the rotor.

[0004] This cleaning is performed by a device called rotor cleaning device, physically dislocated on the piecing carriage with which the spinning apparatus is provided. Some solutions of the prior art provide for the use of a scraper which is first inserted and then rotated in contact with the surface of the inner wall of the rotor to be cleaned. However, this solution involves the drawback of stressing the bearings which rotatably support the rotor in an asymmetrical manner, with considerable forces. The rotor is a component that must rotate at very high rotational speeds of the order of several tens of thousands of revolutions per minute: for this reason, such asymmetric stresses can cause damage to the bearings or in any case can significantly reduce their useful life, requiring more frequent maintenance and/or replacement.

[0005] There are also devices that provide for the insertion of a scraper that moves only radially and then the rotor is rotated by means of a motor and a friction wheel.

[0006] Solutions are also known in the art which provide, for example, the use of scraping elements extensible in a radial direction, described for example in EP1344852/US6910326, so that the scraper enters frontally inside the rotor to be cleaned, in the retracted position so as not to interfere with the mouth and the side wall of the rotor to be cleaned and then, once extracted, it can scrape the throat of the rotor, and possibly said side wall to clean it.

[0007] Such known cleaning systems provide two diametrically opposed scrapers to compensate for radial stresses by reducing to zero (or almost zero) the forces transferred to the rotor. In this way, the radial contact forces exchanged with the rotor are practically nil. However, this solution is not free from drawbacks since it requires a piston and spring device to be actuated, which pushes the scrapers into the working position and another actuator device (typically an electric motor) to allow rotation of the cleaning head (or alternatively of the rotor itself).

[0008] Therefore, these solutions, although avoiding

unbalanced radial loads on the rotor axis, are mechanically complex and therefore expensive.

[0009] US4155217A discloses a rotor cleaning device with a cleaning head comprising a brush supported on a brush shaft.

DISCLOSURE OF THE INVENTION

[0010] Thus the known solutions described above have drawbacks and limitations, essentially due to the fact that they provide for the use of complex and expensive devices to avoid unbalanced radial loads on the rotor.

[0011] Further known solutions, mechanically simpler and cheaper, do not solve the problem of excessive mechanical stress on the rotor for unbalanced radial loads.

[0012] The need to solve the drawbacks and limitations mentioned with reference to the prior art is therefore felt.

[0013] This need is met by a rotor cleaning device of an open-end spinning apparatus according to claim 1, by a piecing carriage of an open-end spinning apparatus according to claim 15 and by an open-end spinning apparatus according to claim 16.

DESCRIPTION OF THE DRAWINGS

[0014] Further features and advantages of the present invention will appear more clearly from the following description of preferred non-limiting embodiments thereof, in which:

figure 1 shows a side view of an open-end type spinning apparatus according to an embodiment of the present invention;

figure 2 shows a partially sectional perspective view of a portion of the open-end type spinning apparatus in figure 1;

figures 3-4 show side views of a rotor cleaning device of an open-end type spinning apparatus according to the present invention, in a retracted and extracted position, respectively;

figure 5 shows a side sectional view of a cleaning apparatus according to an embodiment of the present invention;

figures 6-7 show two sectional views, respectively perspective and side, of a cleaning apparatus according to the present invention;

figure 8 shows a perspective sectional view of a rotor cleaning device in a first step of insertion into a rotor to be cleaned;

figure 9 shows a view of the cleaning device in figure 8, from the side of arrow IX in figure 8;

figure 10 shows a perspective sectional view of a rotor cleaning device in a step of cleaning a rotor;

figure 11 shows a view of the cleaning device in figure 10, from the side of arrow XI in figure 10;

figures 12 to 13 show partial perspective views of further embodiments of rotor cleaning devices of an

open-end type spinning apparatus according to the present invention.

[0015] Elements, or parts of elements, in common to the embodiments described below are referred to with the same reference numerals.

DETAILED DESCRIPTION

[0016] With reference to the above figures, reference numeral 4 globally indicates an overall schematic view of an open-end type spinning apparatus according to the present invention.

[0017] In particular, the spinning apparatus 4 comprises at least one spinning head 8 having a spinning unit 12 and a reel winding unit 16, wherein the reel winding unit 16 wraps on a tube 20 a reel of yarn obtained from the underlying spinning unit 12.

[0018] The spinning apparatus 4 also comprises a tube-holder basket 24 which houses a plurality of tubes 20 on which to wind the yarn.

[0019] The spinning unit 12 comprises an open-end rotor 28 which produces yarn, starting from a roving, in a known manner.

[0020] The spinning apparatus 4 also comprises a doffing carriage 22 which can be positioned at the spinning unit 12 and is provided with a plurality of devices for carrying out operations on the spinning head; for example, such devices may comprise pick-up and transport devices 34 of a tube 20 from the tube-holder basket 24 to a pair of tailstocks 36 of the reel wrapping unit 16, a lifting device for removing the formed reel from the tailstocks and so on.

[0021] The spinning apparatus further comprises a piecing carriage or auxiliary carriage 23 which comprises, for example, a yarn re-attaching device (not shown).

[0022] In the event of breakage of the yarn in production or when the yarn quality falls below a certain predetermined level, the open-end rotor 28 is cleaned, preferably after it has stopped.

[0023] In particular, this cleaning is carried out by means of a rotor cleaning device 40 of an open-end spinning apparatus mounted on said piecing carriage 23.

[0024] The rotor cleaning device 40 comprises a cleaning head 44 for cleaning the open-end rotor 28.

[0025] The open-end rotor 28, in a known manner, comprises a shank 29 for its dragging into rotation and a rotor body 30 having axial symmetrical conformation about an axis of symmetry S-S, coaxial with said shank, and delimiting a cavity 31.

[0026] The axis of symmetry S-S coincides with the axis of rotation of the open-end rotor 28, in a known manner.

[0027] Said cavity 31 comprises a throat 32 and an inner lateral wall 33 which are axial-symmetrical with respect to said axis of symmetry S-S.

[0028] Said cleaning head 44 comprises a scraper 48 and/or a brush 52.

[0029] The scraper 48 is mounted in front of the brush 52 with respect to a frontal approaching direction of the rotor cleaning device 40 to the open-end rotor 28.

[0030] Preferably, the scraper 48 has a tapered conformation so as to be counter-shaped with respect to the groove 32 of said open-end rotor 28. In this way, the cleaning capacity of the scraper 48 is improved near a critical point of the open-end rotor 28, such as the groove 32.

[0031] Preferably, the brush 52 has a tapered conformation along an axial extension, parallel to said axis of symmetry S-S, away from the scraper 48.

[0032] In this way, the brush 52 has brushes which are counter-shaped with respect to the inner lateral wall 33 of the rotor body 30. This improves the cleaning capacity of the brush 52 on the inner lateral wall 33.

[0033] Obviously, the scraper 48 and the brush 52 have such a size that they can be inserted, without interference, at least partially inside the cavity 31 so as to be able to reach and clean the throat 32 and the inner lateral wall 33 of the rotor body 30, respectively.

[0034] Preferably, the scraper 48 and/or the brush 52 are made of a polymeric material having a hardness lower than the hardness of the corresponding open-end rotor 28 to be cleaned. In this way, it is possible to avoid scratches and damages on the throat 32 and on the inner lateral wall 33 of the open-end rotor 28.

[0035] The rotor cleaning device 40 comprises a drive system 56, comprising a first motor 60 for the rotation of the cleaning head 44 and a kinematic mechanism 64 mechanically connecting the first motor 60 to the cleaning head 44.

[0036] Advantageously, the kinematic mechanism 64 comprises a mechanical connection between the first motor 60 and a support 68 of the cleaning head 44 with respect to a main rotation axis X-X of the cleaning head itself.

[0037] In other words, the first motor 60 and the support 68 of the cleaning head 44 rotate together coaxially with the main rotation axis.

[0038] The first motor 60 is preferably, but not exclusively, a step-by-step electric motor.

[0039] Advantageously, the scraper 48 and/or the brush 52 of the cleaning head 44 are rotatably assembled around a secondary rotation axis Y-Y on a pin 72 eccentric to said main axis of rotation X-X and supported by said support 68. The pin 72 is in turn engaged with the first motor 60 by means of a pair of gears 69.

[0040] The secondary rotation axis Y-Y is parallel to the main axis of rotation X-X, and is offset with respect thereto by an eccentricity 76.

[0041] Preferably, said eccentricity 76 is between 7% and 33% of the maximum diameter of the rotor to be cleaned.

[0042] The scraper 48 and the brush 52 are rotatably integral with the same eccentric pin 72.

[0043] Moreover, between the first motor 60 and the support 68 a freewheel 70 is inserted, configured to allow

rotation of the entire support 68 in said active direction.

[0044] In particular, in a first step the first motor 60 and the support 68 rotate together in an active direction of rotation, which can be either clockwise or counterclockwise.

[0045] This rotation is transmitted to the pin 72 by means of the pair of gears 69 and therefore the pin 72 rotates about its own secondary rotation axis Y-Y in a passive direction of rotation, opposite to said active direction. The inversion of the rotation direction is obviously given by said pair of gears 69.

[0046] The scraper 48 and/or the brush 52 rotate inside the open-end rotor 28 until it comes into contact with the throat 32 and/or with the inner lateral wall 33 of the rotor body 30. In this step, the support 68 does not rotate (figures 8-9).

[0047] Following this contact, there is a jamming of the scraper 48 and/or the brush 52 respectively on the throat 32 and/or on the inner lateral wall 33 (figures 10, 11); at this point, the driving torque supplied by the first motor 60 rotates the support 68 which begins to rotate according to the active direction of rotation. In this rotation motion, it drags the scraper 48 and/or the brush 52 with it, so as to effectively clean the throat 32 and/or the inner lateral wall 33 of the open end rotor 28.

[0048] According to an embodiment, the kinematic mechanism 64 comprises a gear train having a case 80 that acts as a support 68 of the cleaning head 44, and a satellite 84, associated with the case 80, which serves as eccentric pin 72.

[0049] The rotor cleaning device 40 further comprises a movement system 88 to bring the cleaning head 44 near the open-end rotor 28 to be cleaned.

[0050] According to an embodiment, the movement system 88 comprises a base 90 and at least one pair of connecting rods 92, 94 which guide according to a tilting movement a containment body 96 which supports the cleaning head 44 and the drive system 56.

[0051] The base 90, the containment body 96 and the pair of connecting rods 92, 94 form an articulated quadrilateral.

[0052] The use of connecting rods 92, 94 allows the containment body 96 to be moved in a controlled manner in space, i.e. parallel to base 90. In this way, it is possible to correctly align the cleaning head 44 with the open-end rotor 28 so as to align the symmetrical axis of the open-end rotor 28 with the main axis of rotation X-X, which must be parallel and coaxial with each other.

[0053] The movement system 88 comprises a second motor 100 for the rotation and controlled positioning of the cleaning head 44, from a retracted or rest configuration (figure 3) to an extracted or working configuration (figure 4).

[0054] According to a possible embodiment, the rotor cleaning device 40 comprises a second cleaning head 104 of a funnel of an open-end spinning apparatus 4.

[0055] For example, the second cleaning head 104 of a funnel comprises a front brush 110 keyed on a turbine

112, for example pneumatically driven (figure 12). Obviously, it is possible to use turbines or impellers with different types of drive, such as an electric drive.

[0056] The second cleaning head 104 of a funnel is oriented along a third axis W-W substantially perpendicular to said main axis of rotation X-X.

[0057] The operation of a rotor cleaning device of an open-end spinning apparatus according to the present invention will now be described.

[0058] In particular, in the event of breakage of the yarn in production or when the yarn quality falls below a certain predetermined level, the open-end rotor 28 is cleaned, preferably after it has stopped.

[0059] Then, the piecing carriage 23 of the open-end spinning apparatus 4 approaches the open-end rotor 28 to be cleaned and the movement system 88 carries the cleaning head 44 from the retracted or rest configuration to the extracted or working configuration, so as to position the cleaning head 44 inside the cavity 31 of the open-end rotor 48 so as to align the main rotation axis X-X with the axis of symmetry S-S of the rotor body 30.

[0060] In particular, the cleaning head moves inside the open end rotor 28 so that the scraper 48 and/or the brush 52 are correctly oriented, i.e. so that the scraper 48 and/or the brush 52 can frontally enter into the open-end rotor 28, without interfering with the rotor body 30 (figures 8-9).

[0061] Then, the drive system 56, by means of the first motor 60, rotates the scraper 48 and/or the brush 52 in an eccentric manner with respect to the main axis of rotation X-X of the first motor 60 which, as seen, is in turn aligned to the symmetry axis S-S of the open-end rotor 28 to be cleaned.

[0062] It should be noted, as seen, that only a first small portion of the torque transmitted by the first motor 60 to the cleaning head 44 is used to rotate the scraper/brush 48, 52; in fact, when the latter is jammed on the throat 32 of the open-end rotor 28 (figures 10, 11), the remaining torque is transferred to the kinematic mechanism, in particular to the support 68 or case 80 which allow the rotation of the whole cleaning head 44 in the same direction of rotation of the first motor 60.

[0063] In this way, it is ensured that there is never an excessive "jamming" torque which would transmit a stress to the open-end rotor 28 which could damage the support bearings thereof. Moreover, as seen, the scrapers 48 and the brush 52 are made of polymers (POM type) which, with their hardness, allow an adequate abrasive action of the impurities without thereby damaging the throat 32 and the inner lateral wall 33 of the open-end rotor 28.

[0064] Furthermore, it is possible to clean the funnel by bringing the front brush 110 into contact with the same funnel and rotating it by means of the turbine 112.

[0065] At the end of the cleaning operation, the rotation of the first motor 60 is reversed; due to the freewheel mechanism 70 during the rotation of the first motor 60, the support 68 cannot rotate according to the passive

direction; in this way, the rotation transmitted to the scraper 48 and/or brush 52 returns the latter to the initial position (figures 8-9) so as to allow subsequent removal of the cleaning head 44 from the open-end rotor 28, without colliding with the mouth of the rotor.

[0066] As can be appreciated from what has been described, the rotor cleaning device of an open-end spinning apparatus and the relative open-end spinning apparatus allow overcoming the drawbacks of the prior art.

[0067] Advantageously, the solution of the present invention allows effectively cleaning the open-end rotor of an open-end spinning apparatus without excessively stressing the open-end rotor in a radial direction, thus preserving the relative bearings of the rotor itself.

[0068] In fact, the torque transmitted by the first motor is used to rotate the scraper/brush; when the latter is impinged on the rotor throat, said torque is transferred to the kinematic mechanism to allow rotation of the entire cleaning head. This ensures that the rotor support bearings are not damaged.

[0069] At the same time, the rotor cleaning device is simple and inexpensive since the scraping elements are not extensible in the radial direction (such as those of the prior art) but leave the resting position 'below the contour' by tilting around the axis on which they are pivoted.

[0070] In addition, the scraper and the brush abrade impurities without damaging the internal surfaces of the rotor: in fact, both the scraper and the brush are made of less harsh polymeric material than the surfaces to be cleaned that are not scratched or abraded thereby. The impurities are then removed by compressed air and aspirated by means of a relative suction system, in a known manner.

[0071] Therefore, the stresses exerted on the rotor during the rotor cleaning step cannot damage either the rotor support bearings or the surfaces of the rotor walls and throat. It therefore follows that it is possible to carry out an adequate cleaning using a single scraper, unlike known solutions which employ two scrapers radially opposite each other.

[0072] Another strength which characterizes the rotor cleaning device of the present invention is the self-adaptability of the head which cleans the rotor. In fact, the tilting system that brings the scrapers into working position allows the scrapers to work in the correct position even when cleaning rotors of different diameters.

[0073] Therefore, with a single cleaning system, the entire range of rotor diameters ranging from 30 to 66 mm in diameter is covered without the need to change/set anything in the system. In prior art systems there is often the need to set a sort of limit switch of the cleaning system through a system of feelers which sense the size of the rotor to be cleaned and adapt the position of the limit switches of the scrapers in a relative manner. In other known systems depending on the size of the rotor, the dimensions of the scraping elements must be adapted.

[0074] Therefore, the solution of the present invention is particularly versatile and adaptable to rotors of different

sizes.

[0075] A man skilled in the art may make several changes and adjustments to the rotor cleaning devices and to the spinning apparatus of the present invention in order to meet specific and incidental needs, all falling within the scope of protection defined in the following claims.

10 Claims

1. Rotor cleaning device (40) for an open-end type spinning apparatus (4) comprising

- a cleaning head (44) for cleaning an open-end rotor (28), said cleaning head (44) comprising a scraper (48) and/or a brush (52),

- a drive system (56), comprising a first motor (60) for the rotation of the cleaning head (44) and a kinematic mechanism (64) mechanically connecting the first motor (60) to the cleaning head (44),

- a movement system (88) to bring the cleaning head (44) near the open-end rotor (28) to be cleaned, wherein

- the kinematic mechanism (64) comprises a mechanical connection between the first motor (60) and a support (68) of the cleaning head (44), the first motor (60) rotating with respect to a main rotation axis (X-X),

- the scraper (48) and/or the brush (52) of the cleaning head (44) are rotatably assembled around a secondary axis (Y-Y) on a pin (72) eccentric to said main axis of rotation (X-X) and supported by said support (68), **characterised in that**

between the first motor (60) and the support (68) a freewheel (70) is inserted, configured to allow the rotation of the entire support (68) in an active direction of rotation of the first motor (60).

2. Rotor cleaning device (40) for an open-end type spinning apparatus (4) according to claim 1, wherein said kinematic mechanism (64) comprises a gear train having a case (80) that acts as said support (68) of the cleaning head (44), and a satellite (84), associated with the case (80), which serves as said eccentric pin (72).

3. Rotor cleaning device (40) for an open-end type spinning apparatus (4) according to claim 1 or 2, wherein said eccentric pin (72) is in turn meshed with the first motor (60) by means of a pair of gears (69).

4. Rotor cleaning device (40) for an open-end type spinning apparatus (4) according to any one of the claims from 1 to 3, wherein the scraper (48) is fitted in front

of the brush (52) with respect to a front direction of juxtaposition of the rotor cleaning device (40) to the open-end rotor (28).

5. Rotor cleaning device (40) for an open-end type spinning apparatus (4) according to any one of the claims from 1 to 4, where the scraper (48) and/or the brush (52) are integral in rotation with said eccentric pin (72). 5
6. Rotor cleaning device (40) for an open-end type spinning apparatus (4) according to any of the preceding claims, wherein the scraper (48) has a tapered shape so as to be counter-shaped to a throat (32) of said open-end rotor (28). 10
7. Rotor cleaning device (40) for an open-end type spinning apparatus (4) according to any of the preceding claims, wherein the brush (52) has a tapered shape along an axial extension moving away from the scraper (48). 15
8. Rotor cleaning device (40) for an open-end type spinning apparatus (4) according to any of the preceding claims, wherein the scraper (48) and/or the brush (52) are made of polymeric material of a lesser hardness than the hardness of the corresponding open-end rotor (28) to be cleaned. 20
9. Rotor cleaning device (40) for an open-end type spinning apparatus (4) according to any of the preceding claims, wherein the movement system (88) comprises a base (90) and at least one pair of connecting rods (92, 94) which guide according to a tilting movement a containment body (96) which supports the cleaning head (44) and the drive system (56). 25
10. Rotor cleaning device (40) for an open-end type spinning apparatus (4) according to claim 9, wherein the base (90), the containment body (96) and the pair of connecting rods (92, 94) realize an articulated quadrilateral. 30
11. Rotor cleaning device (40) for an open-end type spinning apparatus (4) according to any of the preceding claims, wherein the movement system (88) comprises a second motor (100) for the rotation and controlled positioning of the cleaning head (44), from a retracted or rest configuration to an extracted or working configuration. 35
12. Rotor cleaning device (40) for an open-end type spinning apparatus (4) according to any of the preceding claims, wherein the rotor cleaning device (40) comprises a second cleaning head (104) of a funnel of an open-end type spinning apparatus (4). 40
13. Rotor cleaning device (40) for an open-end type spin-

ning apparatus (4) according to claim 12, wherein said second cleaning head (104) of a funnel comprises a front brush (110) keyed on a pneumatically operated turbine (112).

14. Rotor cleaning device for an open-end type spinning apparatus (4) according to claim 12 or 13, wherein the second cleaning head (104) of a funnel is oriented along a third axis (W-W) substantially perpendicular to the main rotation axis (X-X). 45
15. Piecing carriage (23) for an open-end type spinning apparatus (4) comprising a rotor cleaning device (40) according to any of the claims from 1 to 14. 50
16. An open-end type spinning apparatus (4) comprising a rotor cleaning device (40) according to any of the claims from 1 to 14 and/or a piecing carriage (23) according to claim 15. 55
17. An open-end type spinning apparatus (4) according to claim 16, wherein the secondary rotation axis (Y-Y) is parallel to the main rotation axis (X-X), and is offset relative to this by an eccentricity (76) of between 7% and 33% of the maximum diameter of the open-end rotor (28) to be cleaned.

Patentansprüche

1. Rotorreinigungsvorrichtung (40) für eine Offenend-Spinnvorrichtung (4), umfassend:
 - einen Reinigungskopf (44) zum Reinigen eines Offenend-Rotors (28), wobei der Reinigungskopf (44) einen Schaber (48) und/oder eine Bürste (52) umfasst;
 - ein Antriebssystem (56), umfassend einen ersten Motor (60) für die Drehung des Reinigungskopfes (44) und einen kinematischen Mechanismus (64), der den ersten Motor (60) mechanisch mit dem Reinigungskopf (44) verbindet;
 - ein Bewegungssystem (88), um den Reinigungskopf (44) in die Nähe des zu reinigenden Offenend-Rotors (28) zu bringen, wobei
 - der kinematische Mechanismus (64) eine mechanische Verbindung zwischen dem ersten Motor (60) und einer Stütze bzw. einem Träger (68) des Reinigungskopfes (44) umfasst, wobei sich der erste Motor (60) in Bezug auf eine Hauptrotationsachse (X-X) dreht,
 - der Schaber (48) und/oder die Bürste (52) des Reinigungskopfes (44) drehbar um eine Sekundärachse (Y-Y) an einem Stift (72) montiert sind, der exzentrisch zu der Hauptrotationsachse (X-X) ist und durch den Träger (68) gestützt bzw. getragen ist,

- dadurch gekennzeichnet ist, dass** zwischen dem ersten Motor (60) und dem Träger (68) ein Freilauf (70) eingesetzt ist, der konfiguriert ist, die Drehung des gesamten Trägers (68) in einer aktiven Drehrichtung des ersten Motors (60) zu erlauben.
2. Rotorreinigungsvorrichtung (40) für eine Offenend-Spinnvorrichtung (4) nach Anspruch 1, wobei der kinematische Mechanismus (64) einen Getriebezug mit einem Gehäuse (80), das als der Träger (68) des Reinigungskopfes agiert (44) und einen Satelliten (84) umfasst, der dem Gehäuse (80) zugeordnet ist und als der Exzenterstift (72) dient.
 3. Rotorreinigungsvorrichtung (40) für eine Offenend-Spinnvorrichtung (4) nach Anspruch 1 oder 2, wobei der Exzenterstift (72) seinerseits mittels eines Paares Zahnräder (69) mit dem ersten Motor (60) in Eingriff steht bzw. verzahnt ist.
 4. Rotorreinigungsvorrichtung (40) für eine Offenend-Spinnvorrichtung (4) nach einem der Ansprüche 1 bis 3, wobei der Schaber (48) vor der Bürste (52) in Bezug auf eine vordere Nebeneinanderstellungsrichtung der Rotorreinigungsvorrichtung (40) zu dem Offenend-Rotor (28) angeordnet ist.
 5. Rotorreinigungsvorrichtung (40) für eine Offenend-Spinnvorrichtung (4) nach einem der Ansprüche von 1 bis 4, wobei der Schaber (48) und/oder die Bürste (52) integral in Rotation mit dem Exzenterstift (72) sind.
 6. Rotorreinigungsvorrichtung (40) für eine Offenend-Spinnvorrichtung (4) nach einem der vorhergehenden Ansprüche, wobei der Schaber (48) eine verjüngte Form aufweist, um gegengeformt zu einem Hals (32) des Offenend-Rotors (28) zu sein.
 7. Rotorreinigungsvorrichtung (40) für eine Offenend-Spinnvorrichtung (4) nach einem der vorhergehenden Ansprüche, wobei die Bürste (52) eine verjüngte Form entlang einer axialen Erstreckung aufweist, die sich von dem Schaber (48) wegbewegt.
 8. Rotorreinigungsvorrichtung (40) für eine Offenend-Spinnvorrichtung (4) nach einem der vorhergehenden Ansprüche, wobei der Schaber (48) und/oder die Bürste (52) aus Polymermaterial mit einer geringeren Härte als die Härte des entsprechenden zu reinigenden Offenend-Rotors (28) hergestellt sind.
 9. Rotorreinigungsvorrichtung (40) für eine Offenend-Spinnvorrichtung (4) nach einem der vorhergehenden Ansprüche, wobei das Bewegungssystem (88) eine Basis (90) und zumindest ein Paar Pleuel- bzw. Verbindungsstangen (92, 94) umfasst, die gemäß einer Neigebewegung einen Halte- bzw. Eingrenzungskörper (96) führen, der den Reinigungskopf (44) und das Antriebssystem (56) stützt bzw. trägt.
 10. Rotorreinigungsvorrichtung (40) für eine Offenend-Spinnvorrichtung (4) nach Anspruch 9, wobei die Basis (90), der Halte- bzw. Eingrenzungskörper (96) und das Paar Verbindungsstangen (92, 94) ein Gelenkviereck realisieren.
 11. Rotorreinigungsvorrichtung (40) für eine Offenend-Spinnvorrichtung (4) nach einem der vorhergehenden Ansprüche, wobei das Bewegungssystem (88) einen zweiten Motor (100) zur Drehung und kontrollierten Positionierung des Reinigungskopfes (44) aus einer zurückgezogenen Konfiguration oder Ruhekonfiguration in eine herausgezogene Konfiguration oder Arbeitskonfiguration umfasst.
 12. Rotorreinigungsvorrichtung (40) für eine Offenend-Spinnvorrichtung (4) nach einem der vorhergehenden Ansprüche, wobei die Rotorreinigungsvorrichtung (40) einen zweiten Reinigungskopf (104) eines Trichters einer Offenend-Spinnvorrichtung (4) umfasst.
 13. Rotorreinigungsvorrichtung (40) für eine Offenend-Spinnvorrichtung (4) nach Anspruch 14, wobei der zweite Reinigungskopf (104) eines Trichters eine vordere Bürste (110) umfasst, die an einer pneumatisch betriebenen Turbine (112) verkeilt ist.
 14. Rotorreinigungsvorrichtung für eine Offenend-Spinnvorrichtung (4) nach Anspruch 12 oder 13, wobei der zweite Reinigungskopf (104) eines Trichters entlang einer dritten Achse (W-W) im Wesentlichen senkrecht zu der Hauptrotationsachse (X-X) ausgerichtet ist.
 15. Anspinnwagen (23) für eine Offenend-Spinnvorrichtung (4), umfassend eine Rotorreinigungsvorrichtung (40) nach einem der Ansprüche von 1 bis 14.
 16. Offenend-Spinnvorrichtung (4), umfassend eine Rotorreinigungsvorrichtung (40) nach einem der Ansprüche 1 bis 14 und/oder einen Anspinnwagen (23) nach Anspruch 15.
 17. Offenend-Spinnvorrichtung (4) nach Anspruch 16, wobei die sekundäre Rotationsachse (Y-Y) parallel zu der Hauptrotationsachse (X-X) ist und relativ zu dieser durch eine Exzentrizität (76) von zwischen 7% und 33% des maximalen Durchmessers des zu reinigenden Offenend-Rotors (28) versetzt ist.

Revendications

1. Dispositif de nettoyage de rotor (40) pour métier à filer à extrémité libre (4) comprenant
 - une tête de nettoyage (44) permettant de nettoyer un rotor à extrémité libre (28), ladite tête de nettoyage (44) comprenant un racloir (48) et/ou une brosse (52),
 - un système d'entraînement (56), comprenant un premier moteur (60) permettant la rotation de la tête de nettoyage (44) et un mécanisme cinématique (64) raccordant mécaniquement le premier moteur (60) à la tête de nettoyage (44),
 - un système de déplacement (88) permettant d'amener la tête de nettoyage (44) à proximité du rotor à extrémité libre (28) à nettoyer, dans lequel
 - le mécanisme cinématique (64) comprend un raccordement mécanique entre le premier moteur (60) et un support (68) de la tête de nettoyage (44), le premier moteur (60) tournant par rapport à un axe de rotation principal (X-X),
 - le racloir (48) et/ou la brosse (52) de la tête de nettoyage (44) sont assemblés pour pivoter autour d'un axe secondaire (Y-Y) sur une goupille (72) d'excentrique par rapport audit axe de rotation principal (X-X) et supportée par ledit support (68),

caractérisé en ce que

entre le premier moteur (60) et le support (68), une roue libre (70) est insérée et configurée pour permettre la rotation de l'ensemble du support (68) dans une direction de rotation active du premier moteur (60).
2. Dispositif de nettoyage de rotor (40) pour métier à filer à extrémité libre (4) selon la revendication 1, dans lequel ledit mécanisme cinématique (64) comprend un train d'engrenages ayant un carter (80) qui agit comme ledit support (68) de la tête de nettoyage (44), et un satellite (84), associé au carter (80), qui joue le rôle de ladite goupille d'excentrique (72).
3. Dispositif de nettoyage de rotor (40) pour métier à filer à extrémité libre (4) selon la revendication 1 ou 2, dans lequel ladite goupille d'excentrique (72) est, quant à elle, engrenée avec le premier moteur (60) au moyen d'une paire de pignons (69).
4. Dispositif de nettoyage de rotor (40) pour métier à filer à extrémité libre (4) selon l'une quelconque des revendications 1 à 3, dans lequel le racloir (48) est ajusté à l'avant de la brosse (52) par rapport à une direction avant de juxtaposition du dispositif de nettoyage de rotor (40) sur le rotor à extrémité libre (28).
5. Dispositif de nettoyage de rotor (40) pour métier à filer à extrémité libre (4) selon l'une quelconque des revendications 1 à 4, dans lequel le racloir (48) et/ou la brosse (52) sont solidaires en rotation avec ladite goupille d'excentrique (72).
6. Dispositif de nettoyage de rotor (40) pour métier à filer à extrémité libre (4) selon l'une quelconque des revendications précédentes, dans lequel le racloir (48) a une forme effilée de façon à avoir une forme complémentaire d'un collet (32) dudit rotor à extrémité libre (28).
7. Dispositif de nettoyage de rotor (40) pour métier à filer à extrémité libre (4) selon l'une quelconque des revendications précédentes, dans lequel la brosse (52) a une forme effilée suivant une extension axiale en s'éloignant du racloir (48).
8. Dispositif de nettoyage de rotor (40) pour métier à filer à extrémité libre (4) selon l'une quelconque des revendications précédentes, dans lequel le racloir (48) et/ou la brosse (52) sont constitués d'un matériau polymère d'une dureté inférieure à la dureté du rotor à extrémité libre (28) correspondant à nettoyer.
9. Dispositif de nettoyage de rotor (40) pour métier à filer à extrémité libre (4) selon l'une quelconque des revendications précédentes, dans lequel le système de déplacement (88) comprend une base (90) et au moins une paire de bielles (92, 94) qui guident selon un déplacement en basculement un corps de confinement (96) qui supporte la tête de nettoyage (44) et le système d'entraînement (56).
10. Dispositif de nettoyage de rotor (40) pour métier à filer à extrémité libre (4) selon la revendication 9, dans lequel la base (90), le corps de confinement (96) et la paire de bielles (92, 94) réalisent un quadrilatère articulé.
11. Dispositif de nettoyage de rotor (40) pour métier à filer à extrémité libre (4) selon l'une quelconque des revendications précédentes, dans lequel le système de déplacement (88) comprend un second moteur (100) pour la rotation et le positionnement commandé de la tête de nettoyage (44), depuis une configuration rétractée ou de repos vers une configuration extraite ou de travail.
12. Dispositif de nettoyage de rotor (40) pour métier à filer à extrémité libre (4) selon l'une quelconque des revendications précédentes, dans lequel le dispositif de nettoyage de rotor (40) comprend une seconde tête de nettoyage (104) d'une trémie d'un métier à filer à extrémité libre (4).
13. Dispositif de nettoyage de rotor (40) pour métier à filer à extrémité libre (4) selon la revendication 12,

dans lequel ladite seconde tête de nettoyage (104) d'une trémie comprend une brosse avant (110) clavetée sur une turbine pneumatique (112).

14. Dispositif de nettoyage de rotor pour métier à filer à extrémité libre (4) selon la revendication 12 ou 13, dans lequel la seconde tête de nettoyage (104) d'une trémie est orientée selon un troisième axe (W-W) sensiblement perpendiculaire à l'axe de rotation principal (X-X). 5
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15. Chariot de rattachage (23) pour métier à filer à extrémité libre (4) comprenant un dispositif de nettoyage de rotor (40) selon l'une quelconque des revendications 1 à 14. 15
16. Métier à filer à extrémité libre (4) comprenant un dispositif de nettoyage de rotor (40) selon l'une quelconque des revendications 1 à 14 et/ou un chariot de rattachage (23) selon la revendication 15. 20
17. Métier à filer à extrémité libre (4) selon la revendication 16, dans lequel l'axe de rotation secondaire (Y-Y) est parallèle à l'axe de rotation principal (X-X), et est décalé par rapport à celui-ci d'une excentricité (76) entre 7 % et 33 % du diamètre maximal du rotor à extrémité libre (28) à nettoyer. 25

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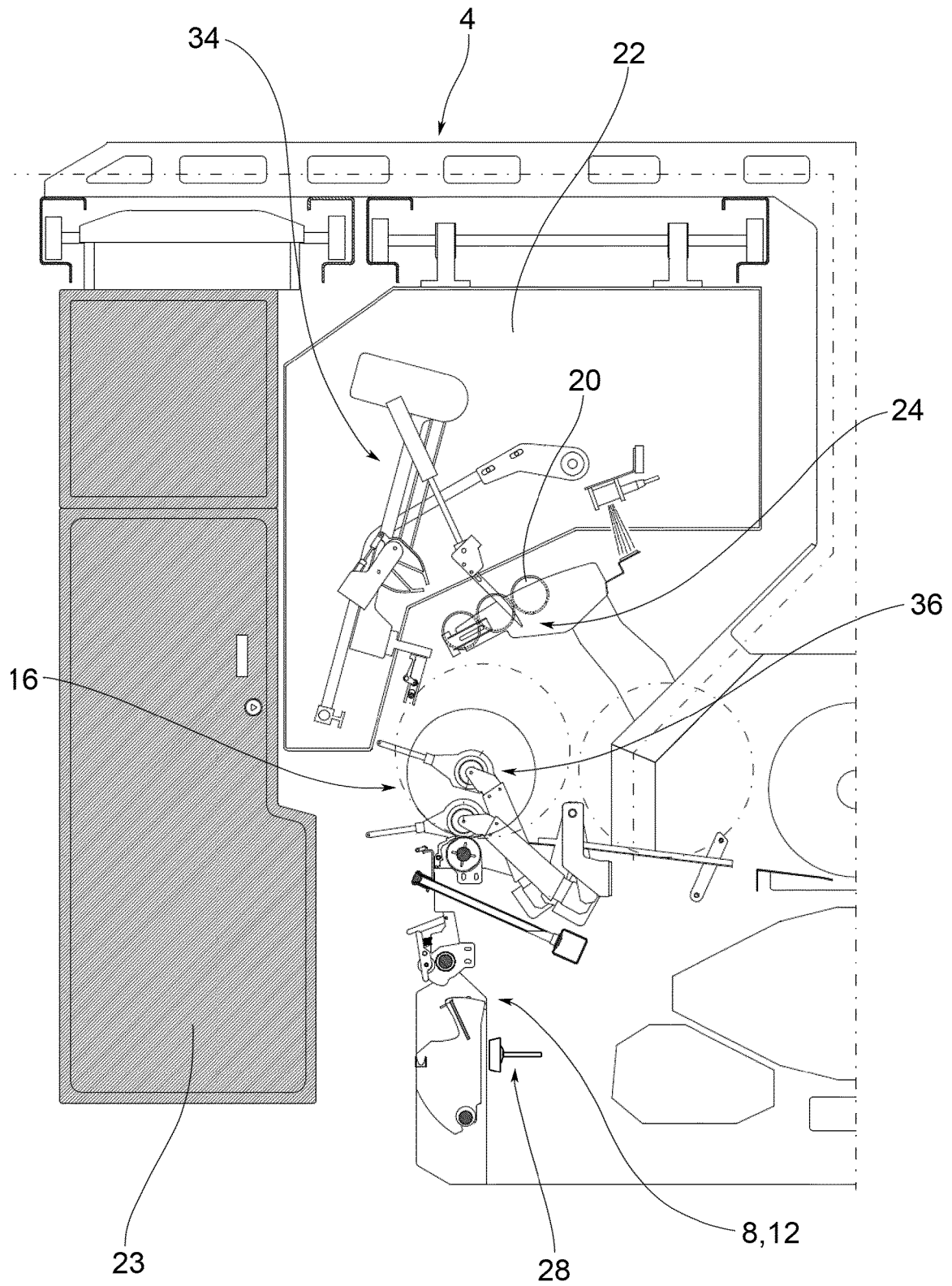


FIG.1

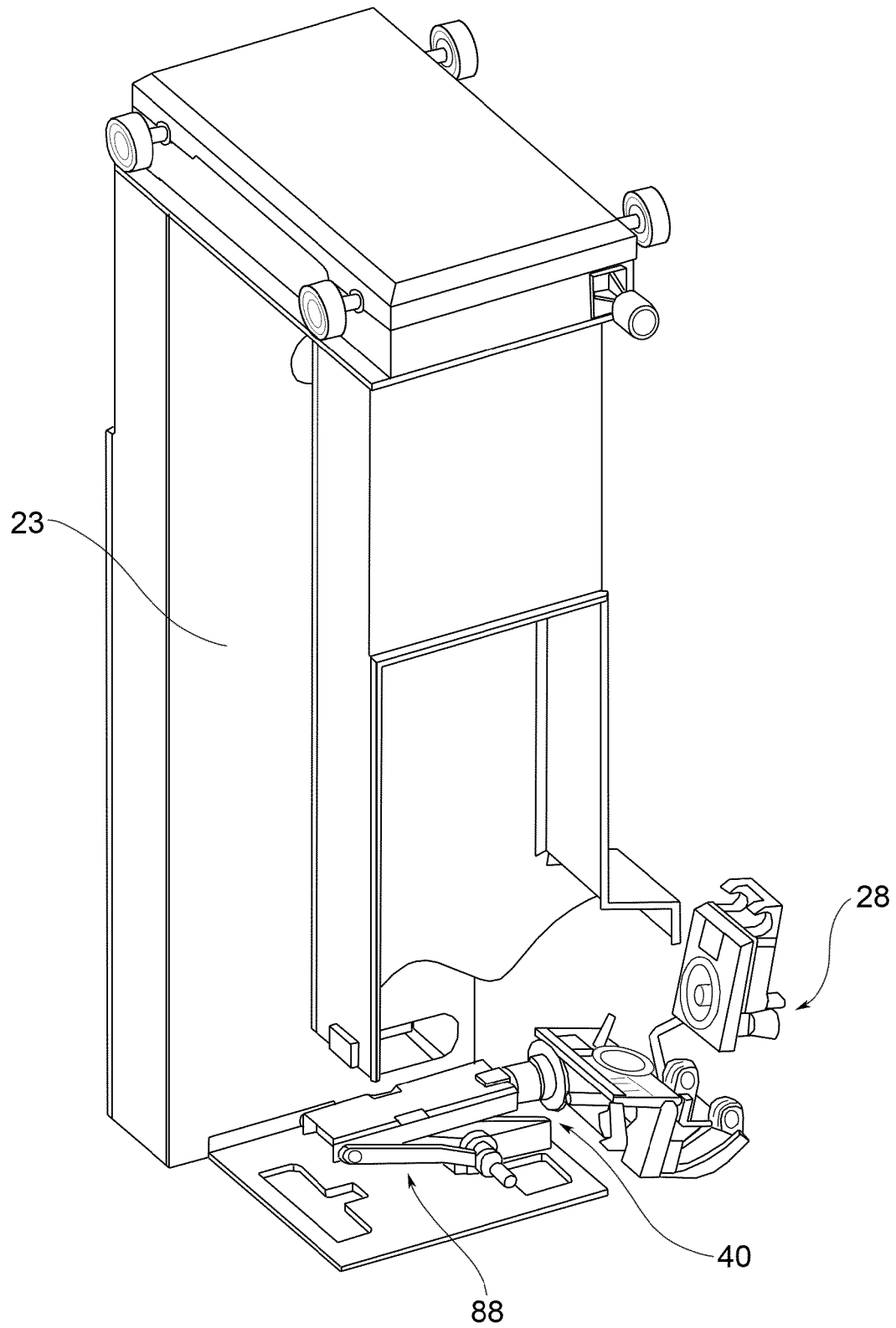


FIG.2

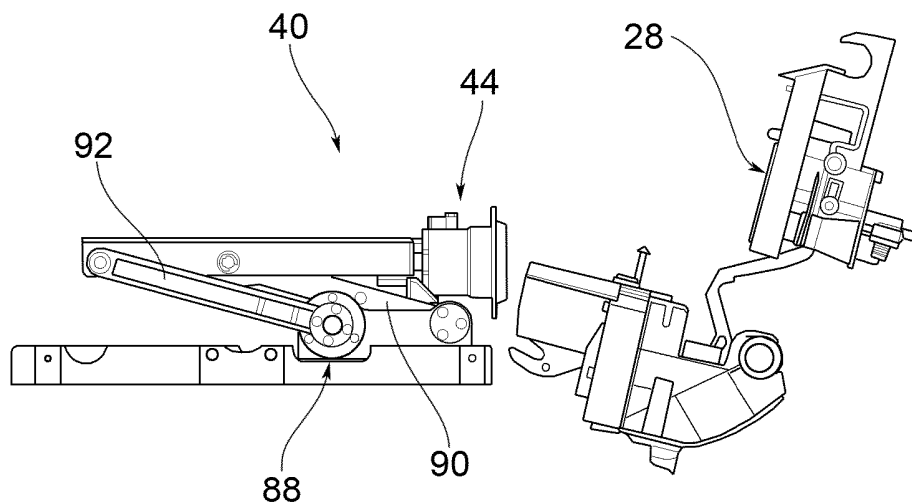


FIG. 3

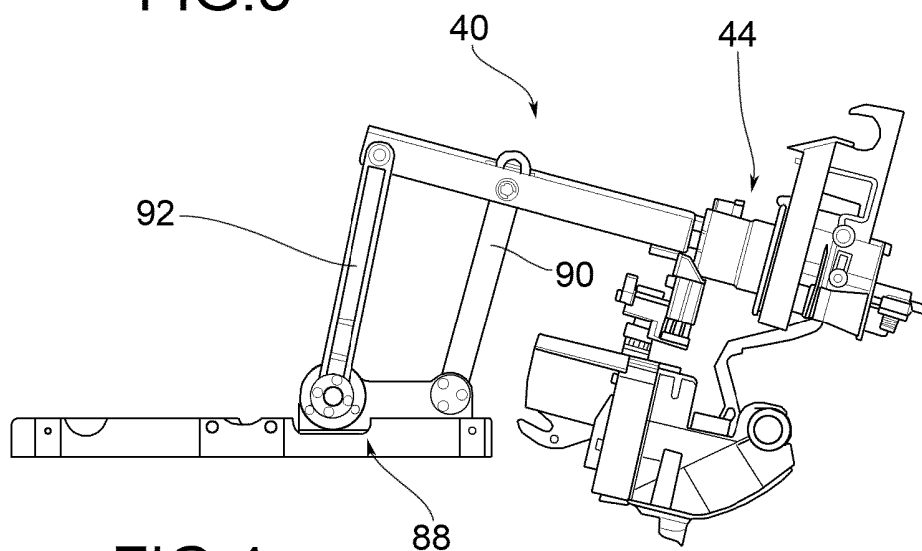


FIG. 4

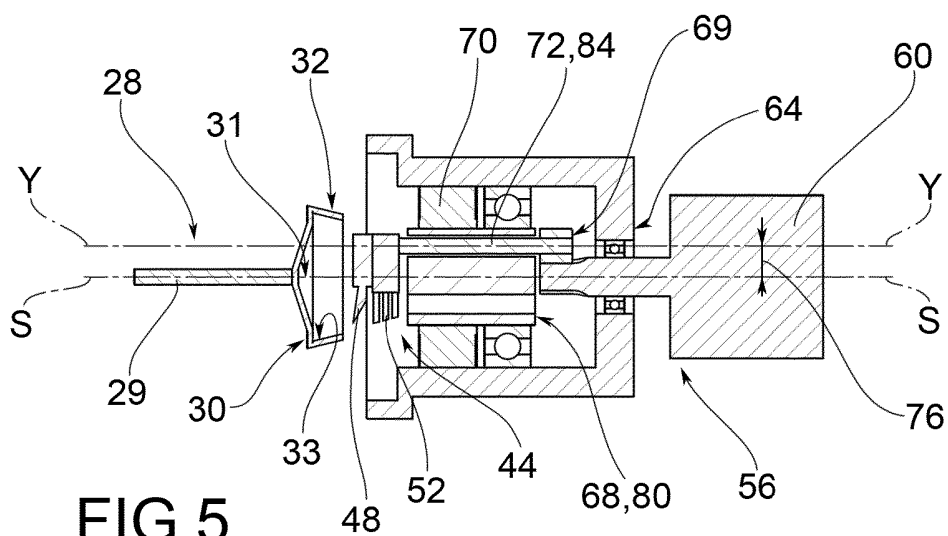


FIG. 5

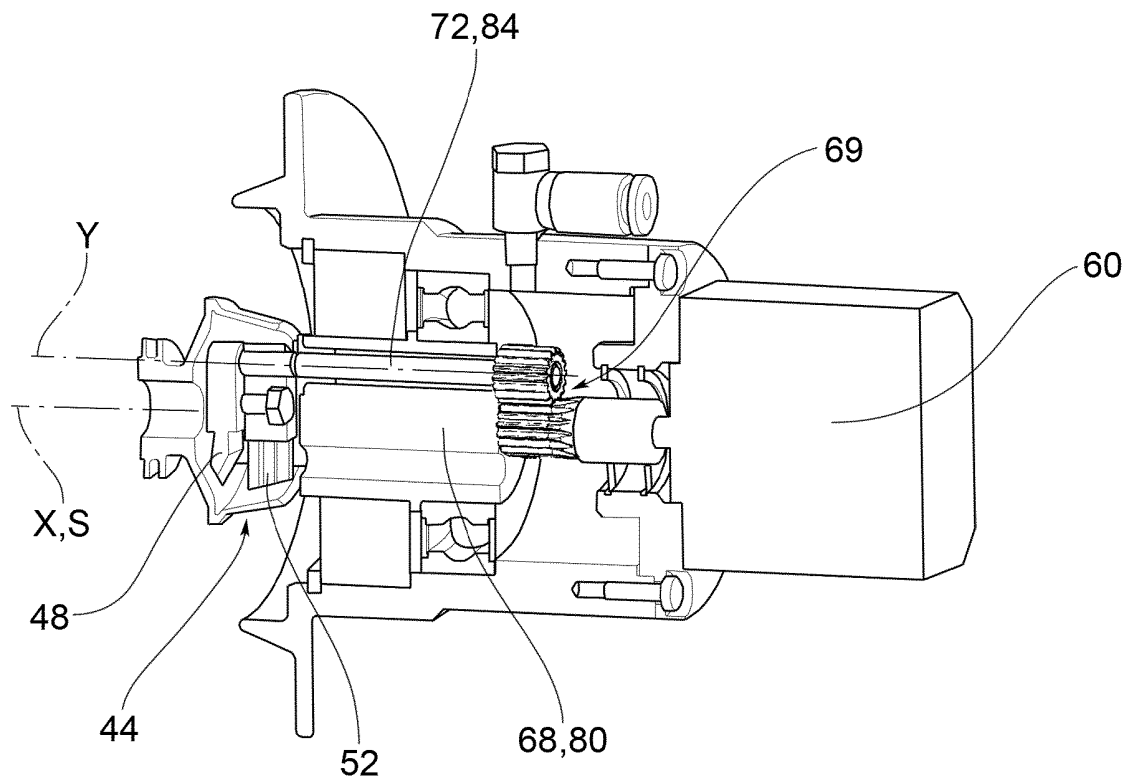


FIG.6

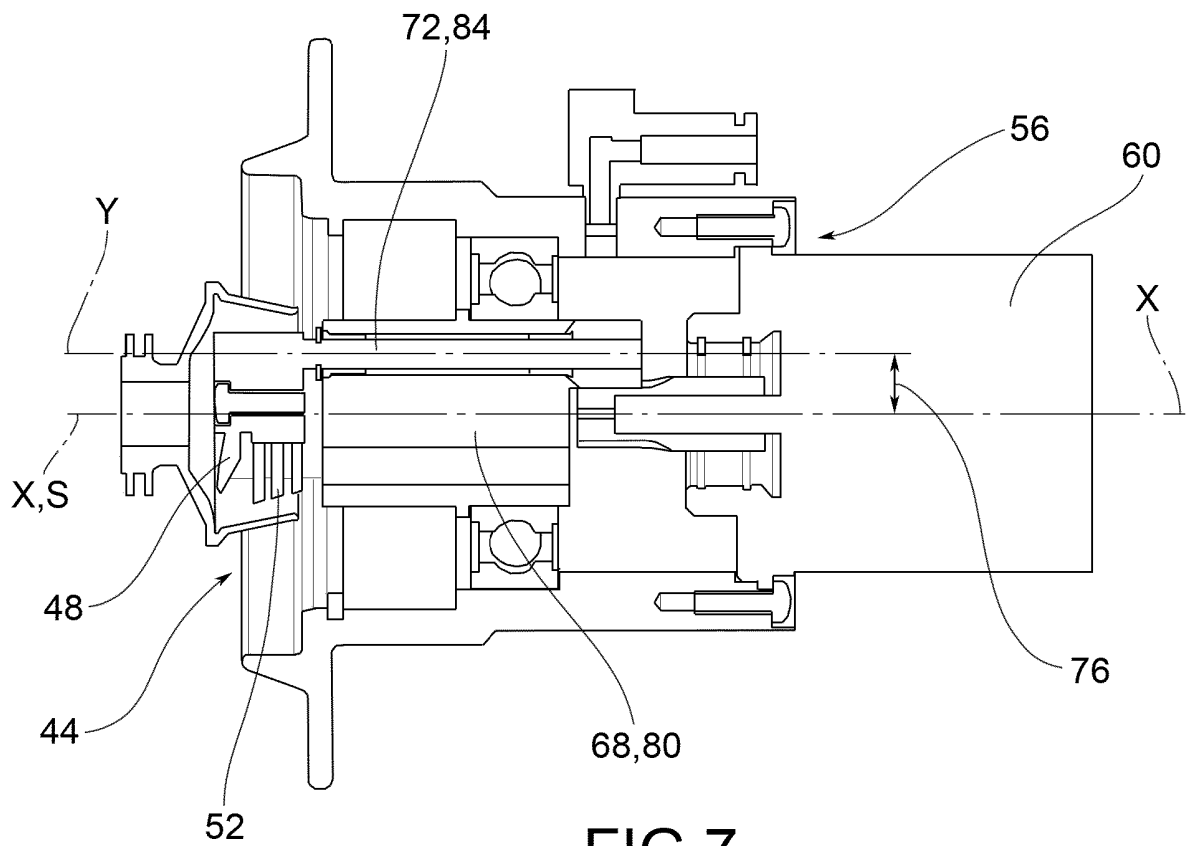


FIG.7

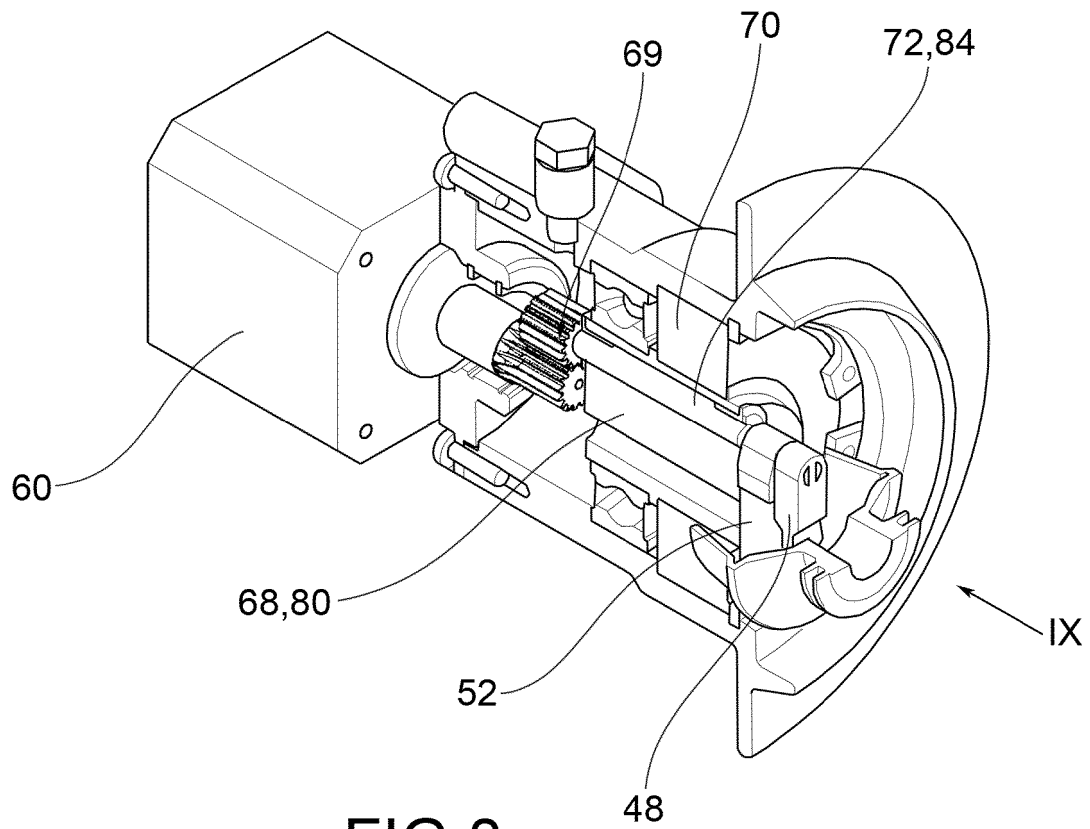


FIG. 8

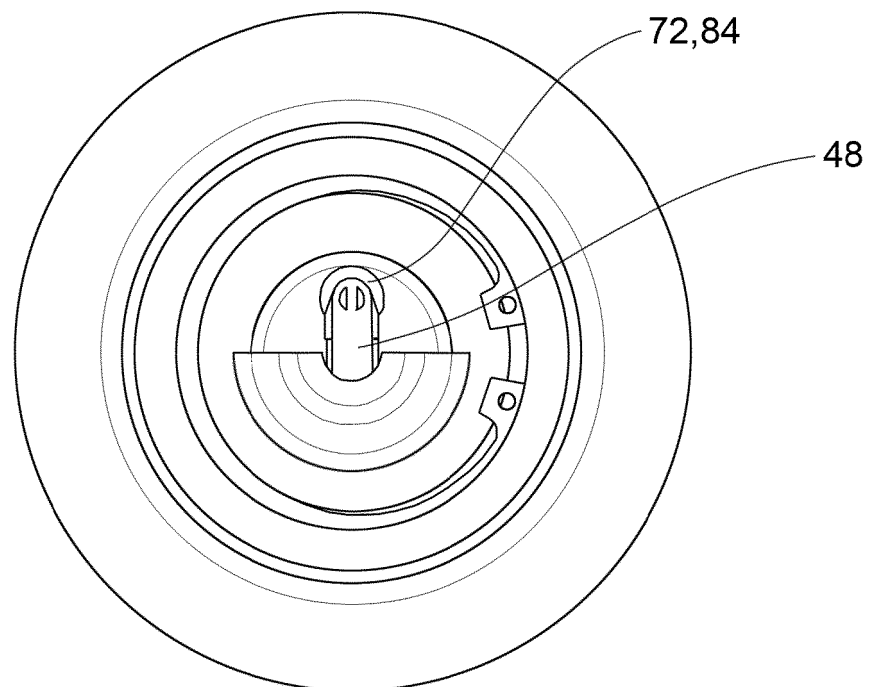


FIG. 9

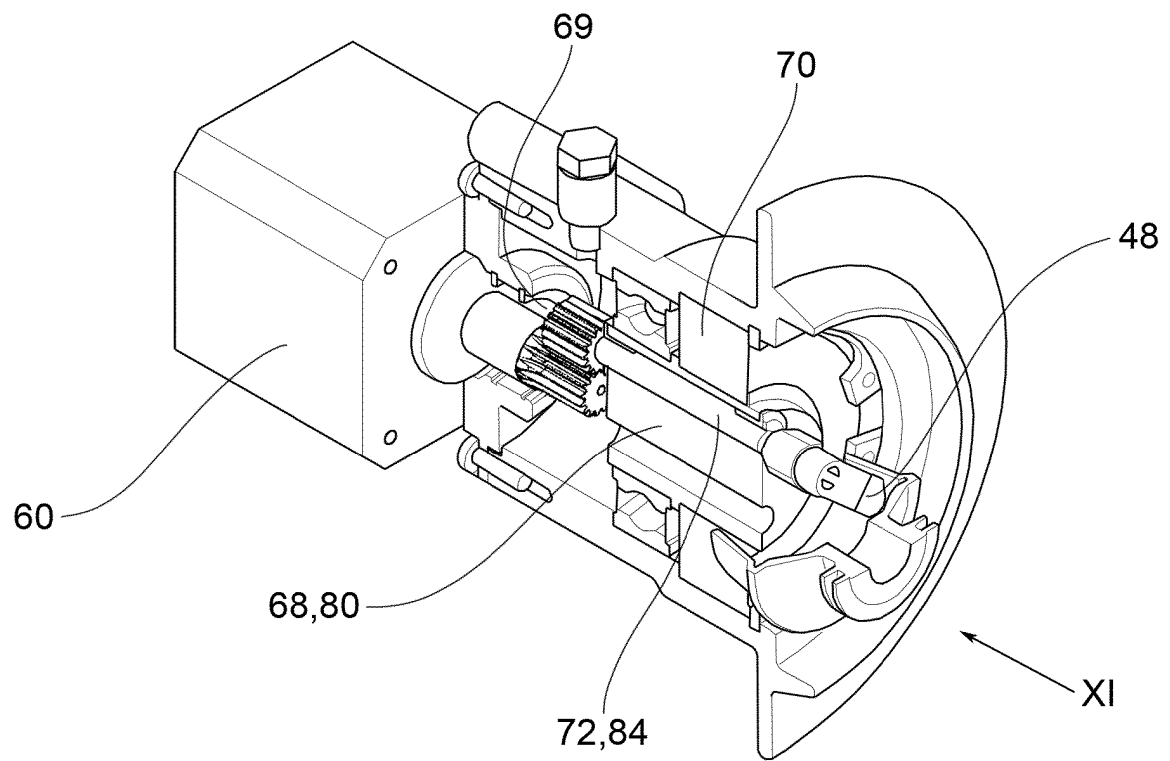


FIG.10

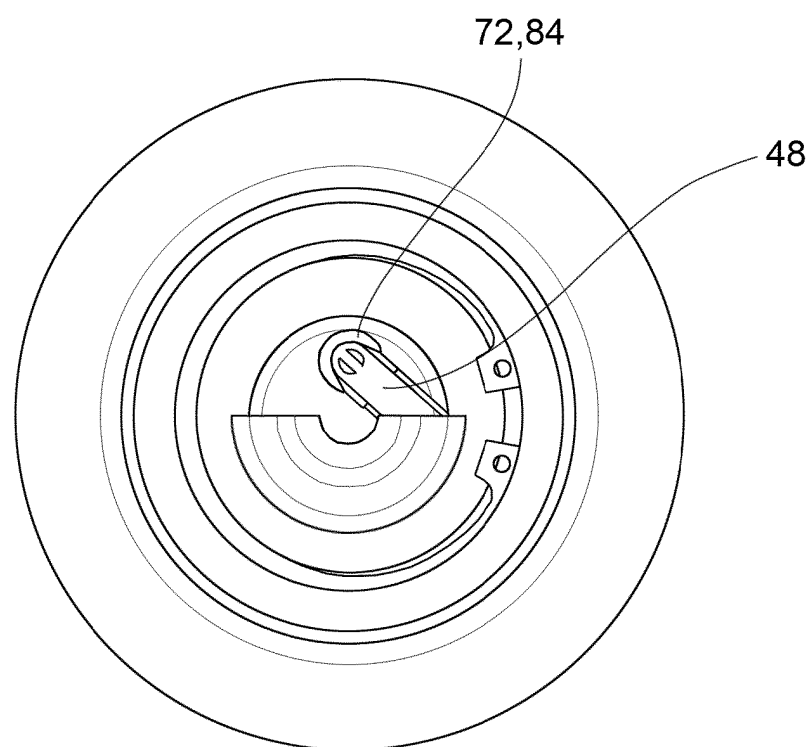


FIG.11

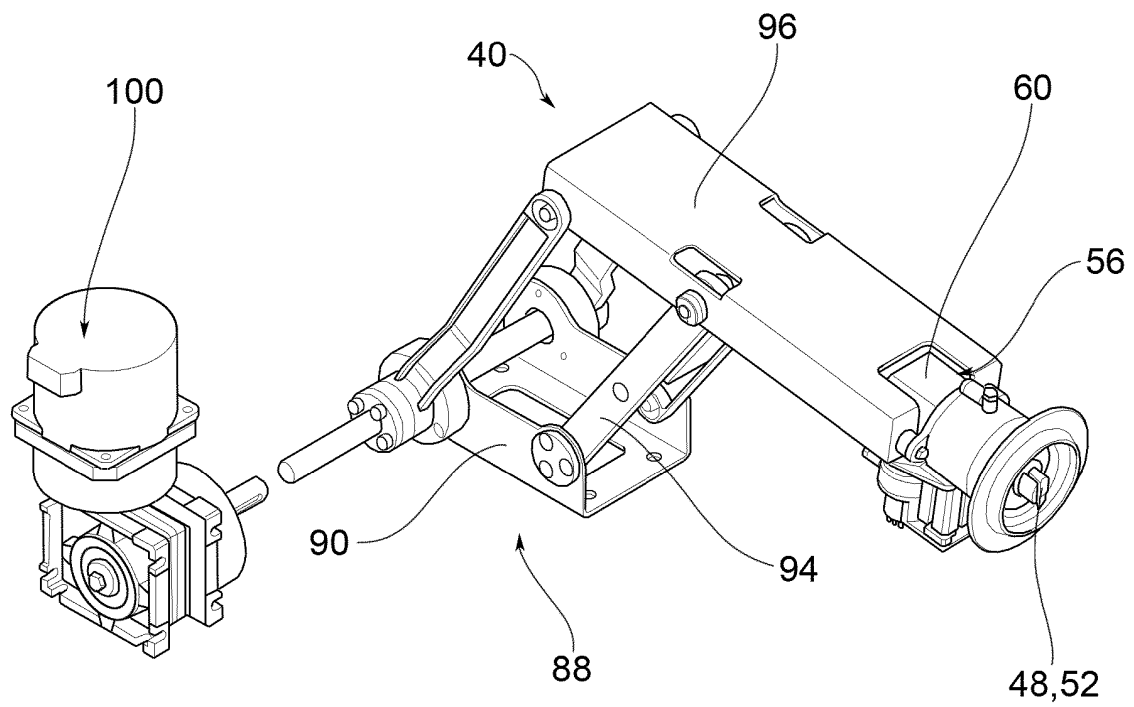


FIG. 13

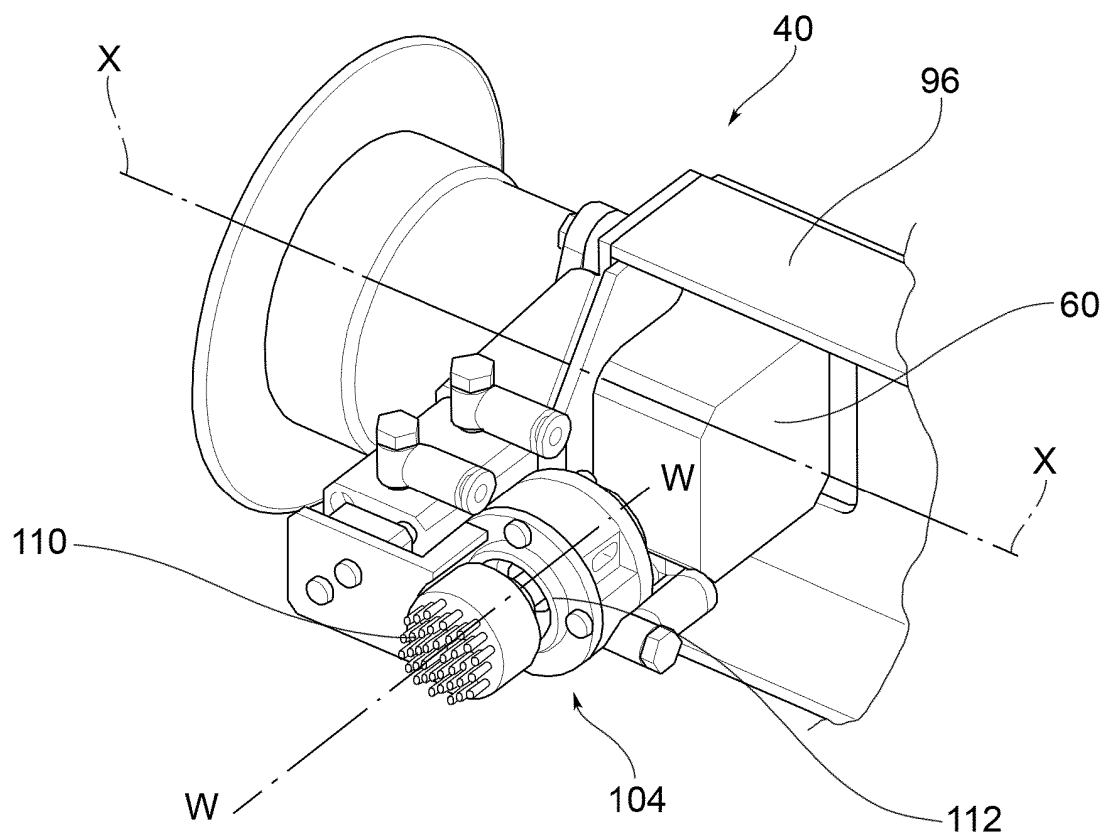


FIG. 12

REFERENCES CITED IN THE DESCRIPTION

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