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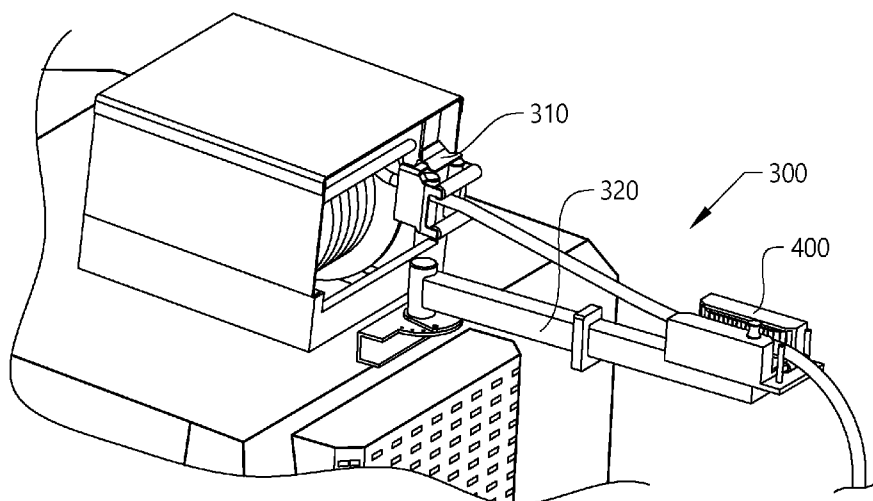


FIG. 2

(57) **Abstract:** A feeder (400) for feeding a cable or hose operatively connected to a machine (100) for mining or construction, the cable/hose (200) being connected remote from the machine (100) at another end thereof, wherein the cable/hose feeder (400) is arranged to be placed on the machine (100). The cable/hose feeder (400) comprises a feeding means (420), arranged to engage the cable/hose (200), a transmission means (430), operatively connecting a drive system to the feeding means (420). The transmission means (430) comprises a one-way drive mechanism (432), configured to allow the feeding means (420) to be driven by the drive system in a first direction, and freewheel in a second, opposite direction.

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CABLE FEEDER

Technical field

[0001] The present invention relates generally to a cable feeder. Specifically, a cable feeder arranged on a mining or construction machine.

Background art

[0002] For work in mining environments, a shift to electrically powered machines and vehicles is underway. The shift aims at least at improving the working environment as well as a step to lessen a dependence on fossil fuel. Furthermore, there are many additional positive effects of electrification. The working environment is not only cleaner from removing exhaust gases, but also having less noise. Removing exhaust gases furthermore lowers the demands on ventilation system capacity in underground environments.

[0003] One solution for facilitating the transition to electrical driven machines is connecting an electric cable to the machine, for example for transport, operation and for charging of on-board batteries. A cable may for example be needed when battery power is not sufficient for the heavy and energy intensive operations performed by the mining machines. The cable provides the machine with electricity during operation and therefore trails behind the machine in the mining environment.

[0004] During operation, the cable is reeled in and out by means of a cable handling system, commonly located at the back of the machine. The cable handling system may be configured to position the cable on a cable reel when reeling in the cable. The cable handling system may furthermore position the cable on the ground to prevent the machine from running over the cable.

[0005] A problem with present cable handling systems is the risk of tangling of the cable in the cable handling system. For example, the cable may be tangled on the cable reel. If the cable is tangled, an operator may be required to climb up onto the mining machine to un-tangle it, which presents a great risk to the operator as

operators in the mining environment are commonly not equipped with sufficient safety equipment for such a task. Sometimes, two operators are even required to solve the problem which, in addition to the increased risk, is highly time consuming and inefficient. Furthermore, for remotely operated machines, or autonomously operated machines, there may not even be operators nearby.

[0006] Thus, there is a need to improve cable handling systems on mining machines, for example to prevent tangling of the cable.

[0007] Corresponding issues are related to hoses connected to the mining machine, and trailing behind the machine to a liquid source, such as a source of pressurized gas. A hose may for example be a hydraulic hose connected to a remote hydraulic pump. Hydraulic systems are vital on mining machines, for example for operating tools such as drills. Thus, tangling of such a hose leads to production stops and may be dangerous to people nearby.

Summary of invention

[0008] An object of the present disclosure is to overcome at least some of the problems outlined above. This object is achieved in a first aspect of the disclosure by providing a feeder for feeding a cable or hose operatively connected to a machine for mining or construction, the cable/hose being connected remote from the machine at another end thereof. The cable/hose feeder is arranged to be placed on the machine. The cable/hose feeder comprises a feeding means 420, arranged to engage the cable/hose, a transmission means 430, operatively connecting a drive system to the feeding means 420, wherein the transmission means 430 comprises a one-way drive mechanism, configured to allow the feeding means 420 to be driven by the drive system in a first direction, and freewheel in a second, opposite direction.

[0009] The cable/hose feeder is configured to feed or pull the cable/hose in the first direction to reel out the cable/hose from the machine. The cable/hose is for example reeled out when the machine is traveling forward or turning and therefore requires more cable/hose between the machine and the remote connection point

of the cable/hose. The cable/hose may also be reeled out for the purpose of detangling the cable/hose when it has been tangled for example on a cable/hose reel. Since the cable/hose is allowed to freewheel in the second direction, the cable/hose feeder does not create any resistance or obstacle when the cable/hose is pulled through the cable feeder in that direction. This may for example be advantageous when the cable/hose is reeled in and out by means of different parts of a system. As such, the one-way drive mechanism makes it possible to utilize the cable/hose feeder only for reeling out the cable/hose, without it presenting an obstacle when reeling in the cable/hose.

[0010] In an exemplary embodiment, the feeding means comprises at least one conveyor belt.

[0011] In an exemplary embodiment, the feeding means comprises a first conveyor belt and second conveyor belt arranged opposite each other, between which the cable/hose is arranged to pass.

[0012] By increasing the contact surface between the cable/hose and the feeding means 420, less wear is caused. Furthermore, a risk of creating sharp bends for the cable/hose is decreased, compared to for example utilizing rollers to feed the cable/hose.

[0013] In an exemplary embodiment, the at least one conveyor belt comprises a plurality of conveyor segments being linked to form a closed loop. In an exemplary embodiment, each conveyor segment is releasably attached to the at least one conveyor belt.

[0014] Having separate conveyor segments means that the segments may be exchanged when worn out, or when a different design is desired, without having to exchange the entire cable/hose feeder.

[0015] In an exemplary embodiment, each conveyor segment is 3D-printed.

[0016] 3D-printing the conveyor segments allows for changing the design of the conveyor belt, without having to exchange the entire conveyor belt. For example,

improving the design to better engage the cable/hose, or adapting the design for a different cable/hose dimension.

[0017] In an exemplary embodiment, the feeding means is formed by a polymer material.

[0018] In an exemplary embodiment, the one-way drive mechanism operatively connects the transmission means to the feeding means.

[0019] In an exemplary embodiment, the transmission means comprises a transmission shaft, and wherein the one-way drive mechanism is arranged at an end of the transmission shaft.

[0020] In an exemplary embodiment, the freewheel mechanism is a one-way ball bearing.

[0021] In an exemplary embodiment, the freewheel mechanism is a one-way clutch.

[0022] According to a second aspect of the disclosure, there is provided a feeding system for feeding a cable or hose operatively connected to a machine for mining or construction, the cable/hose being connected remote from the machine at another end thereof, wherein the cable/hose feeding system is arranged to be placed on the machine. The cable/hose feeding system comprises a cable/hose reel, onto which the cable/hose is arranged to be wound, a cable/hose guiding arm 320, extending from the cable/hose reel, and a cable/hose feeder according to any one of the exemplary embodiments.

[0023] In an exemplary embodiment, the cable/hose feeder is arranged on the cable/hose guiding arm.

[0024] In an exemplary embodiment, the cable/hose feeder is arranged to pull the cable/hose in a first direction to reel out the cable/hose from the cable/hose reel, and the cable/hose reel is arranged to rotate to pull the cable/hose in a second direction, opposite the first direction, to reel in the cable/hose on the cable/hose reel.

[0025] According to a third aspect of the disclosure there is provided a machine for mining or construction, the machine being operatively connected to a cable/hose, the cable/hose being connected remote from the machine at another end thereof, wherein the machine comprises a cable/hose feeder according to any one of the exemplary embodiments or a cable/hose feeding system according to any one of the exemplary embodiments.

[0026] In an exemplary embodiment, the machine is a surface mine machine.

[0027] In an exemplary embodiment, the machine is a drill rig.

[0028] In an exemplary embodiment, the machine is an electrically powered machine.

Brief description of drawings

[0029] The invention is now described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 displays an embodiment of a machine according to the disclosure,

Fig. 2 displays an embodiment of a cable feeding system according to the disclosure,

Fig. 3 displays an embodiment of a cable feeder according to the disclosure,

Fig. 4 displays an embodiment of a cable feeder according to the disclosure,

Fig. 5 displays an embodiment of a transmission means 430 according to the disclosure,

Fig. 6 displays an embodiment of a one-way drive mechanism according to the disclosure,

Figs. 7a-7c display embodiments of a one-way ball bearing according to the disclosure.

Description of embodiments

[0030] In the following, a detailed description of a cable feeder, a cable feeding system and machine for mining or construction will be described. In the figures, like reference numerals designate identical or corresponding elements throughout the figures. It will be appreciated that these figures are for illustration only and do not in any way restrict the scope of the present disclosure. As disclosed above, issues disclosed herein relating to electric cables are also related to hoses operatively connected to, and trailing behind, the machine to a liquid source. As such, when reference is made to cables, and cable related equipment, it will be understood that these solutions should be seen as equally applicable to hoses.

[0031] With reference to Fig. 1 there is displayed a machine 100. In Fig. 1, the machine 100 is exemplified as a mining machine. When reference is made to a mining machine, this will be understood as a machine 100 arranged to travel and operate in a mining environment. Thus, the machine 100 may for example perform operations specifically related to mining, such as drilling, or other operations necessary for the operations in a mining environment, such as related to construction and ground preparations. The mining environment may be, but is not limited to, an underground mine, a surface mine, an open-pit mine. The mining environment may be an area adjacent to or in connection to a mine. As such, the mining environment could be seen as any area where the mining machine may normally travel during operation. According to the embodiment in Fig. 1, the machine 100 is exemplified as a drill rig. The drill rig in Fig. 1 is mobile, meaning that it can travel in a mining environment for example for the purpose of drilling holes at various locations. In alternative embodiments, the machine 100 is another type of mining machine, for example a loader, dumper, truck, excavator, haulers. The machine 100 may be operated by an operator sitting inside the machine 100, operated by a remote operator or autonomously operated.

[0032] In an alternative embodiment, the machine 100 is a construction machine, arranged to travel and operate at a construction site, such as for example a road construction site, or a power plant construction site. In an alternative embodiment, the machine 100 is a quarry machine, arranged to travel

and operate at a quarry. The machine 100 may be operated by an operator sitting inside the machine 100, operated by a remote operator or autonomously operated.

[0033] In Fig. 1, a cable 200 is operatively connected to a back section of the machine 100. The cable 200 provides electrical energy to the machine 100. The energy supplied through the cable 200 is utilized by the machine 100 for example to travel in the mining environment, or for operating tools such as a drill on the machine 100.

[0034] In Fig. 2, a cable feeding system 300 is visible. In Fig. 2, the cable feeding system 300 is arranged on the machine 100. In other embodiments, the cable feeding system 300 may be arranged in another position on the machine 100, corresponding to the position where the cable 200 is operatively connected to the machine 100.

[0035] The cable feeding system 300 generally comprises a cable guide 310 to position the cable 200 when reeling the cable 200 in and out, a guiding arm 320 and a cable feeder 400. In one embodiment, the cable feeding system 300 further comprises a cable 200 reel onto which the cable 200 may be wound. In one embodiment, the cable guide 310 is arranged to position the cable 200 on the cable 200 reel when reeling in the cable 200.

[0036] The cable feeder 400 will now be described with reference to Fig. 3. The cable feeder 400 is arranged at a distal end of the cable feeding system 300. Preferably at a distal end of the guiding arm 320, relative the machine 100. The cable feeder 400 generally comprises a housing 410 through which the cable 200 is arranged to pass, a feeding means 420 configured to engage the cable 200 in the housing 410 and a transmission means 430 configured to operatively connect the feeding means 420 to a drive system. The drive system may for example comprise a motor, such as an electric motor. The drive system may furthermore be communicatively connected to a control system, such that feeding in the feeding system may be controlled. Controlling the feeding may comprise controlling a feeding speed, such as a feeding speed of the cable 200 in alignment to a

tramming/moving speed of the machine 100 and/or a feeding speed of the cable 200 in alignment to a movement pattern of the machine 100.

[0037] In one embodiment, the housing 410 has the shape of a rectangular cuboid. In one embodiment, the housing 410 has a proximal end and a distal end wherein, when the cable feeder 400 is mounted on the machine 100, the proximal end is directed towards the machine 100 and the distal end is arranged directed away from the machine 100. It will be understood that when the guiding arm 320 is movable relative the machine 100, the cable feeder 400 may also move such that for example the proximal end is directed more or less towards the machine 100. The proximal end comprises a first opening 411 and the distal end comprises a second opening 412, wherein the cable 200 is arranged to pass between the first opening 411 and the second opening 412. The feeding means 420 is arranged in the housing 410, between the first opening 411 and the second opening 412 such that the feeding means 420 may engage the cable 200 to feed the cable 200. In one embodiment, the housing 410 comprises attaching means for attaching the cable feeder 400 to the cable feeding system 300, preferably to the guiding arm 320. In one embodiment, the housing 410 is permanently attached to the cable feeding system 300, preferably to the guiding arm 320, such as being welded or bolted.

[0038] In one embodiment, the feeding means 420 is in the form of at least one conveyor belt. During operation, the at least one conveyor belt is driven by the drive system. The cable 200 is arranged to pass between the at least one conveyor belt and an opposite surface. In one embodiment, the at least one conveyor belt is loaded against the cable 200, for example spring-loaded (illustrated by four arrows in Fig. 4a and Fig. 5). This provides that the cable 200 is squeezed between the at least one conveyor belt and the opposite surface such that movement of the conveyor belt causes movement of the cable 200, thus feeding the cable 200.

[0039] In the embodiment seen in Fig. 4a, the feeding means 420 is in the form of a first conveyor belt 421 and second conveyor belt 422, arranged opposite each

other, between which the cable 200 is arranged to pass. In this embodiment, the second conveyor belt 422 constitutes the opposite surface, that is, the cable 200 is squeezed between the first conveyor belt 421 and the second conveyor belt 422. In one embodiment, the first conveyor belt 421 and second conveyor belt 422 are loaded against each other, for example spring-loaded, and thus against the cable 200 when passing therethrough. In one embodiment, the only the second conveyor belt 422 is loaded, and the first conveyor belt 421 is fixed. In one embodiment, the first conveyor belt 421 is operatively connected, by the transmission means 430, to the drive system, and the second conveyor belt 422 is loaded against the first conveyor belt 421, for example spring-loaded. In one embodiment, the tension of a loaded conveyor belt is controlled by the control system.

[0040] In one embodiment, the cable feeder 400 further comprises a support structure on which the at least one conveyor belt is arranged. In one embodiment, the support structure comprises a pair of rotating means, and the conveyor belt is suspended on the pair of rotating means. In one embodiment, a first rotating element 441 of the pair of rotating means is arranged to rotate freely, such that, when the conveyor belt moves in either direction, the first rotating element 441 moves with it. In one embodiment, a second rotating element 442 of the pair of rotating means is operatively connected to the drive system, preferably through the transmission means 430, such that the drive system may drive the second rotating element 442 to rotate to cause movement of the conveyor belt. In one embodiment, one of four rotating elements is operatively connected to the drive system, and the remaining three are arranged to rotate freely. In one embodiment, one rotating element in each pair of rotating means is driven by the drive system. In one embodiment, one rotating element is operatively connected to the drive system, and wherein the cable feeder 400 further comprises means to transmit the rotation to at least one additional rotating element.

[0041] In one embodiment, the at least one conveyor belt comprises a plurality of conveyor segments. The plurality of conveyor segments is interconnected or linked to form the conveyor belt. In one embodiment, each of the plurality of

conveyor segments is releasably attached to the at least one conveyor belt. In one embodiment, the at least one conveyor belt is arranged on the support structure, preferably on the rotating means. In one embodiment, the conveyor segments can be released from the at least one conveyor belt without removing the conveyor belt from the support structure.

[0042] In Figs. 4b and 4c, two embodiments of a conveyor segment 423 are displayed. In one embodiment, formed of a polymer material. In one embodiment, the plurality of conveyor segments is produced by a freeform manufacturing method such as 3D-printing. In the embodiment in Fig. 4b, the conveyor segment 423 comprises an engagement surface 423a, arranged to engage the cable 200. In one embodiment, the engagement surface 423a has a shape adapted for engaging the cable 200. In one embodiment, the engagement surface 423a has the shape of a semicircle or truncated circle. The embodiment in Fig. 4c additionally comprises two tracks 423b. The tracks 423b are configured to connect the conveyor segment 423 to the linker, for example in a snap-fit manner. The number and design of the tracks 423b depend on the design and configuration of the linker. In other embodiments, other means of connecting the plurality of conveyor segments to the conveyor belt are possible, such as by other mechanical fastenings or by magnets.

[0043] With reference to Fig. 5 there is displayed an embodiment of the transmission means 430 of the cable feeder 400. The transmission means 430 generally comprises a transmission shaft 431 and a one-way drive mechanism 432. The transmission shaft 431 is configured to connect the cable feeder 400 to the drive system. The one-way drive mechanism 432 is configured to allow the feeding means 420 to be driven by the drive system in a first direction, and freewheel in a second, opposite direction.

[0044] When the feeding means 420 is driven in the first direction, it is configured to engage the cable 200 and feed the cable 200 out from the machine 100, in other words, reel out the cable 200. Specifically, when the drive system causes the transmission shaft 431 to rotate in the first direction, the feeding means

420 is caused to move. Preferably, rotation of the rotation means is caused which in turn causes rotation of the conveyor belt, which engages the cable 200 and reels out the cable 200 from the machine 100.

[0045] Conversely, reeling in the cable 200 is driven by a part of the cable feeding system 300 other than the cable feeder 400. In one embodiment, the cable 200 is reeled in by rotation of the cable reel. As such, the cable 200 is pulled in the second, opposite direction through the cable feeder 400. To this end, the cable feeder 400 allows the cable 200 to pass freely therethrough in the second, opposite direction.

[0046] With reference to Figs. 6a-6c, embodiments of the one-way drive mechanism 432 are displayed. The one-way drive mechanism 432 is configured to transmit torque between the transmission shaft 431 and cable feeder 400 in the first direction and enable free motion, or freewheeling, in the second, opposite direction.

[0047] In the embodiment displayed in Fig. 6, a basic working principle of a freewheel mechanism is illustrated as a ratchet freewheel mechanism 4321. Rotating in the first direction, saw teeth or a ratchet of a drive disc 4321a lock with the teeth of the driven disc 4321b, making it rotate at the same speed. If the drive disc drive disc 4321a rotates in the second direction, the teeth of the driven disc 4321b slip over the drive disc teeth and continue rotating.

[0048] In the embodiments displayed in Figs. 7a-c, the one-way drive mechanism 432 is exemplified as a one-way ball bearing 4322, generally comprising an inner ring 4322a and an outer ring 4322b. The torque of the transmission shaft 431 is transmitted by balls 4322c of the ball bearing to the cable feeder 400. In the embodiments displayed in in Fig. 7a and Fig. 7b, cross sections of one-way ball bearings are displayed. The torque of the inner ring 4322a in the first direction is transmitted to the outer ring 4322b when balls 4322c of the ball bearing wedge against interior ramps. When the transmission shaft 431 rotates in the first direction, the balls 4322c lock with the outer ring 4322b making it rotate in unison. During rotation of either the inner ring 4322a or the outer ring 4322b in the

second direction, the balls 4322c slip inside the one-way ball bearing, allowing freewheeling. In the embodiment displayed in Fig. 7a, the balls 4322c are additionally spring-loaded for smoother freewheeling. Fig. 7c displays an embodiment of a one-way ball bearing, further displaying an inner surface and an outer surface of the ball bearing, wherein the transmission shaft 431 is configured to engage a first groove 4322d in the inner surface, to transmit torque to the one-way ball bearing, and wherein the feeding means 420 is configured to engage a second groove 4322e in the outer surface to receive the torque.

[0049] In an alternative embodiment, the one-way drive mechanism 432 is a one-way clutch. In one embodiment, the one-way clutch is an electromagnetic clutch. The electromagnetic clutch is configured to be activated, that is to transmit torque, when the drive system is activated, such as when the motor of the drive system is activated to reel out the cable 200. As such, the electromagnetic clutch is configured not to be activated, that is to allow freewheel, when the motor of the drive system is not active. In one embodiment, the electromagnetic clutch is controlled by the control system.

[0050] Preferred embodiments of a cable feeder, a cable feeding system and machine for mining or construction have been disclosed above. However, a person skilled in the art realizes that this can be varied within the scope of the appended claims without departing from the inventive idea. All the described alternative embodiments above or parts of an embodiment can be freely combined or employed separately from each other without departing from the inventive idea as long as the combination is not contradictory.

- - -

CLAIMS

1. A feeder (400) for feeding a cable or hose operatively connected to a machine (100) for mining or construction, the cable/hose (200) being connected remote from the machine (100) at another end thereof, wherein the cable/hose feeder (400) is arranged to be placed on the machine (100), the cable/hose feeder (400) comprising:

a feeding means (420), arranged to engage the cable/hose (200),

a transmission means (430), operatively connecting a drive system to the feeding means (420),

wherein the transmission means (430) comprises a one-way drive mechanism (432), configured to allow the feeding means (420) to be driven by the drive system in a first direction, and freewheel in a second, opposite direction.

2. The cable/hose feeder (400) according to claim 1, wherein the feeding means (420) comprises at least one conveyor belt.

3. The cable/hose feeder (400) according to claim 2, wherein the feeding means (420) comprises a first conveyor belt (421) and second conveyor belt (422) arranged opposite each other, between which the cable/hose (200) is arranged to pass.

4. The cable/hose feeder (400) according to any claim 2 or 3, wherein the at least one conveyor belt comprises a plurality of conveyor segments (423) being linked to form a closed loop.

5. The cable/hose feeder (400) according to claim 4, wherein each conveyor segment (423) is releasably attached to the at least one conveyor belt.

6. The cable/hose feeder (400) according to claim 4 or 5, wherein each conveyor segment (423) is 3D-printed.

7. The cable/hose feeder (400) according to any one of the preceding claims, wherein the feeding means (420) is formed by a polymer material.

8. The cable/hose feeder (400) according to any one of the preceding claims, wherein the one-way drive mechanism (432) operatively connects the transmission means (430) to the feeding means (420).
9. The cable/hose feeder (400) according to any one of the preceding claims, wherein the transmission means (430) comprises a transmission shaft (431), and wherein the one-way drive mechanism (432) is arranged at an end of the transmission shaft (431).
10. The cable/hose feeder (400) according to any one of the preceding claims, wherein the freewheel mechanism is a one-way ball bearing.
11. The cable/hose feeder (400) according to any one of the preceding claims, wherein the freewheel mechanism is a one-way clutch.
12. A feeding system for feeding a cable or hose operatively connected to a machine for mining or construction, the cable/hose (200) being connected remote from the machine (100) at another end thereof, wherein the cable/hose feeding system (300) is arranged to be placed on the machine (100), the cable/hose feeding system (300) comprising:
- a cable/hose reel, onto which the cable/hose (200) is arranged to be wound,
 - a cable/hose guiding arm (320), extending from the cable/hose reel, and
 - a cable/hose feeder (400) according to any one of the preceding claims 1-11.
13. The cable/hose feeding system (300) according to claim 12, wherein the cable/hose feeder (400) is arranged on the cable/hose guiding arm (320).
14. The cable/hose feeding system (300) according to claim 12 or 13, wherein
- the cable/hose feeder (400) is arranged to pull the cable/hose (200) in a first direction to reel out the cable/hose (200) from the cable/hose reel, and
 - the cable/hose reel is arranged to rotate to pull the cable/hose (200) in a

second direction, opposite the first direction, to reel in the cable/hose (200) on the cable/hose reel.

15. A machine for mining or construction, the machine (100) being operatively connected to a cable/hose (200), the cable/hose (200) being connected remote from the machine (100) at another end thereof, wherein the machine (100) comprises a cable/hose feeder (400) according to any one of claims 1-11, or a cable/hose feeding system (300) according to any one of claims 12-14.

16. The machine (100) according to claim 15, wherein the machine (100) is a surface mine machine.

17. The machine (100) according to claim 15 or 16, wherein the machine (100) is a drill rig.

18. The machine (100) according to any one of claims 15-17, being an electrically powered machine.

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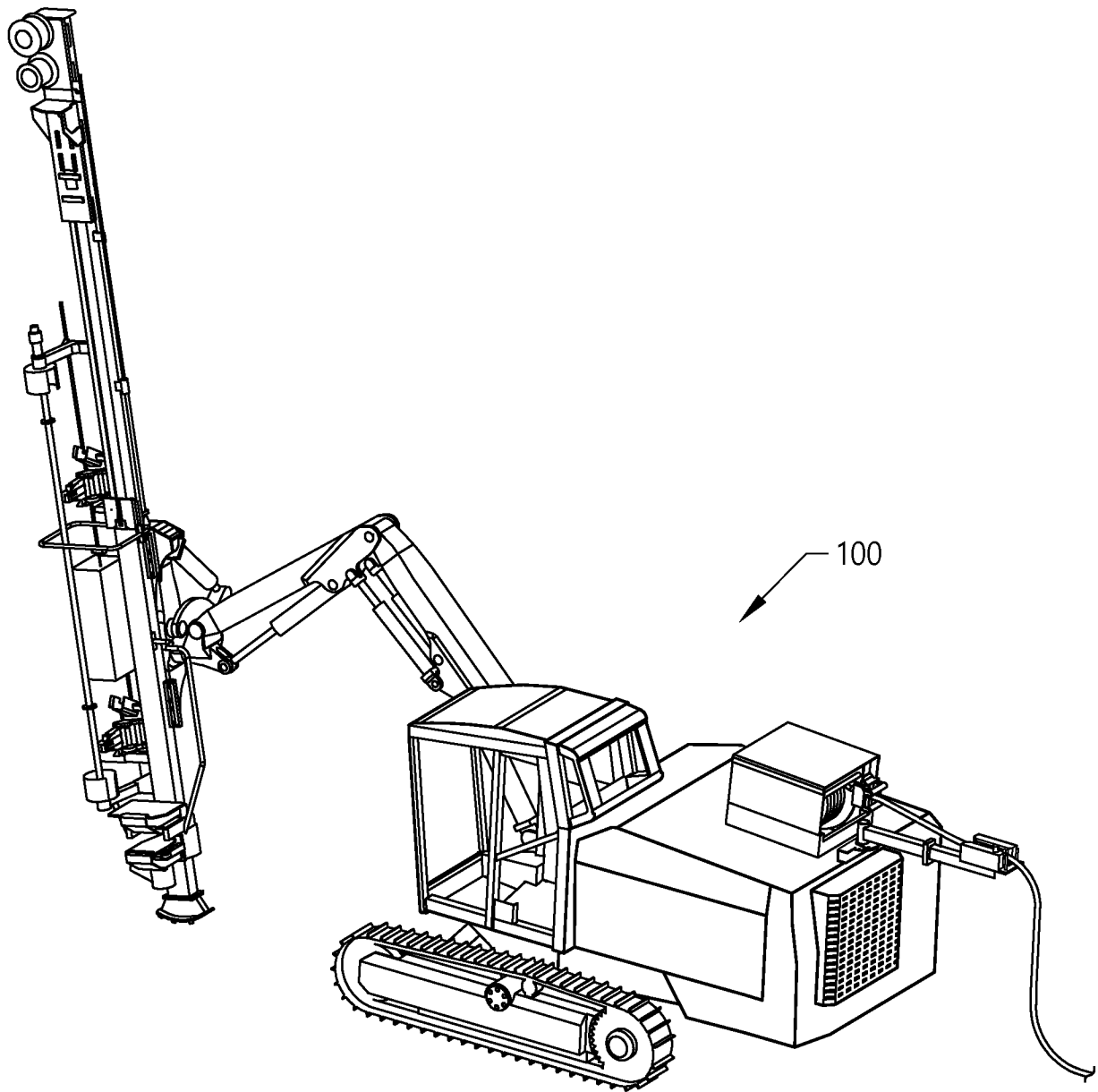


FIG. 1

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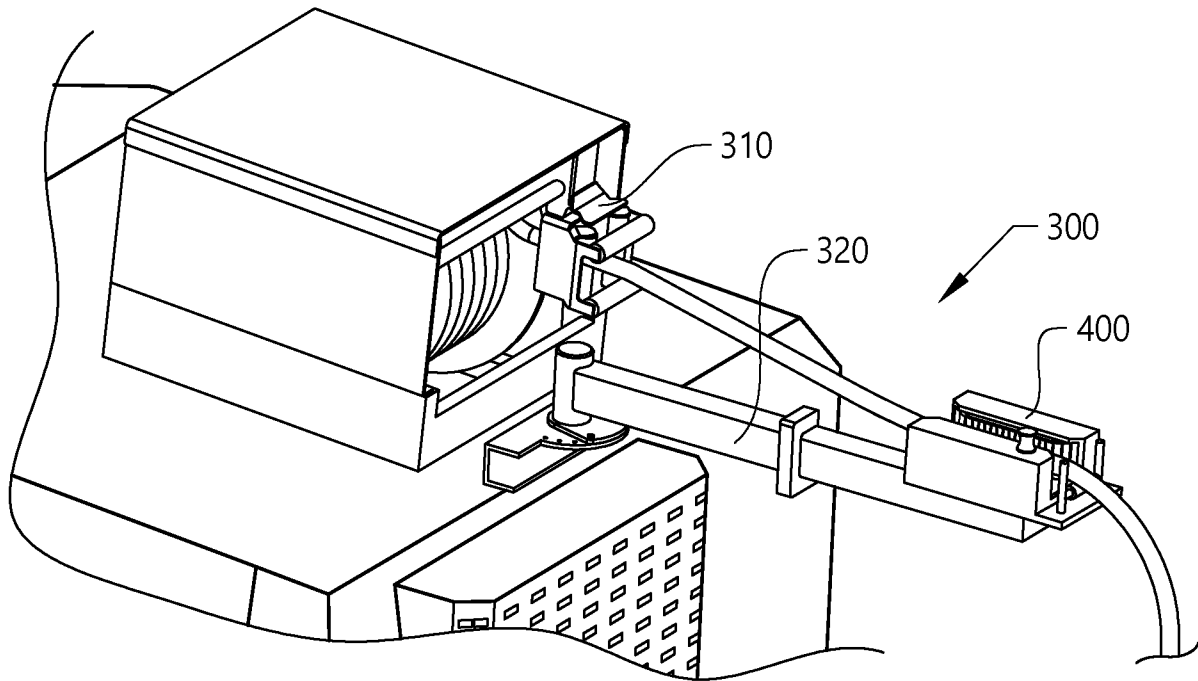


FIG. 2

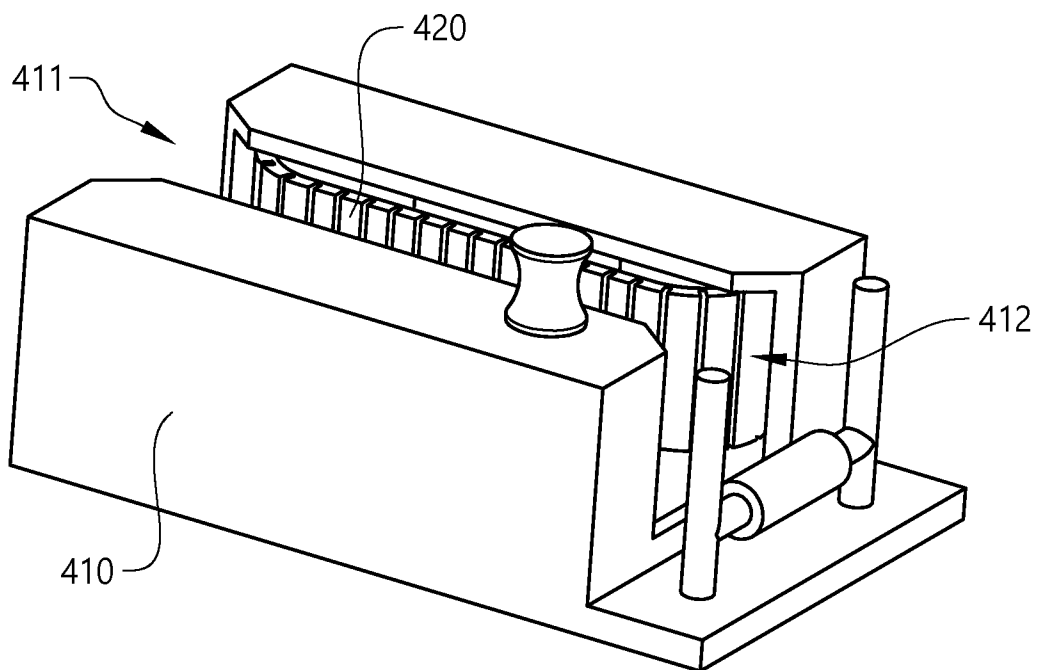


FIG. 3

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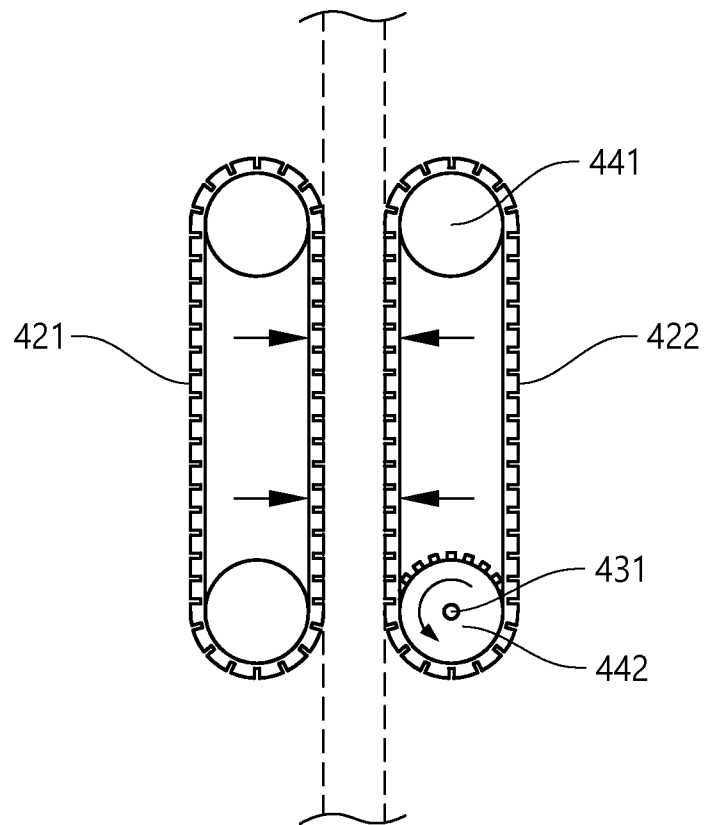


FIG. 4a

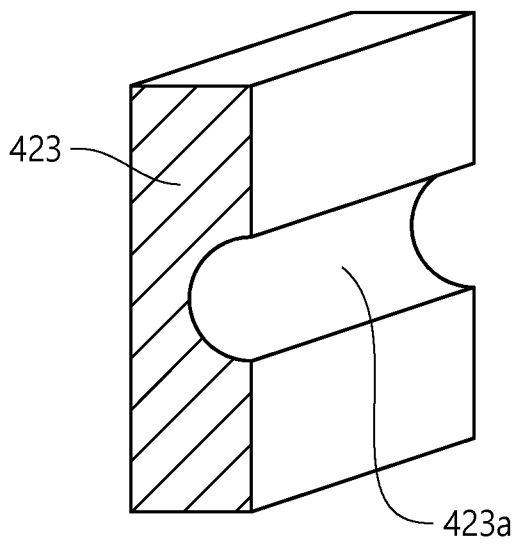


FIG. 4b

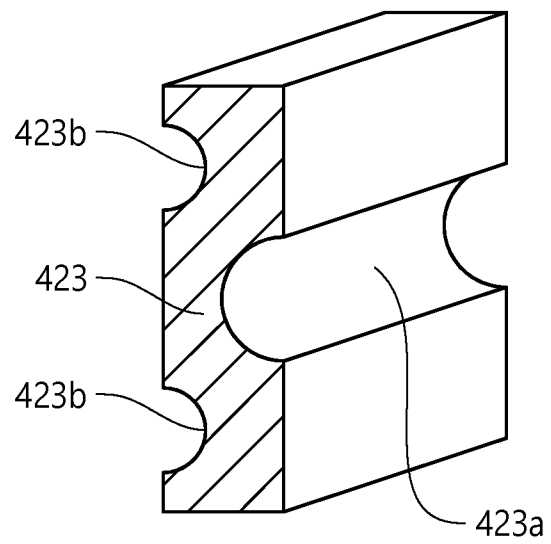


FIG. 4c

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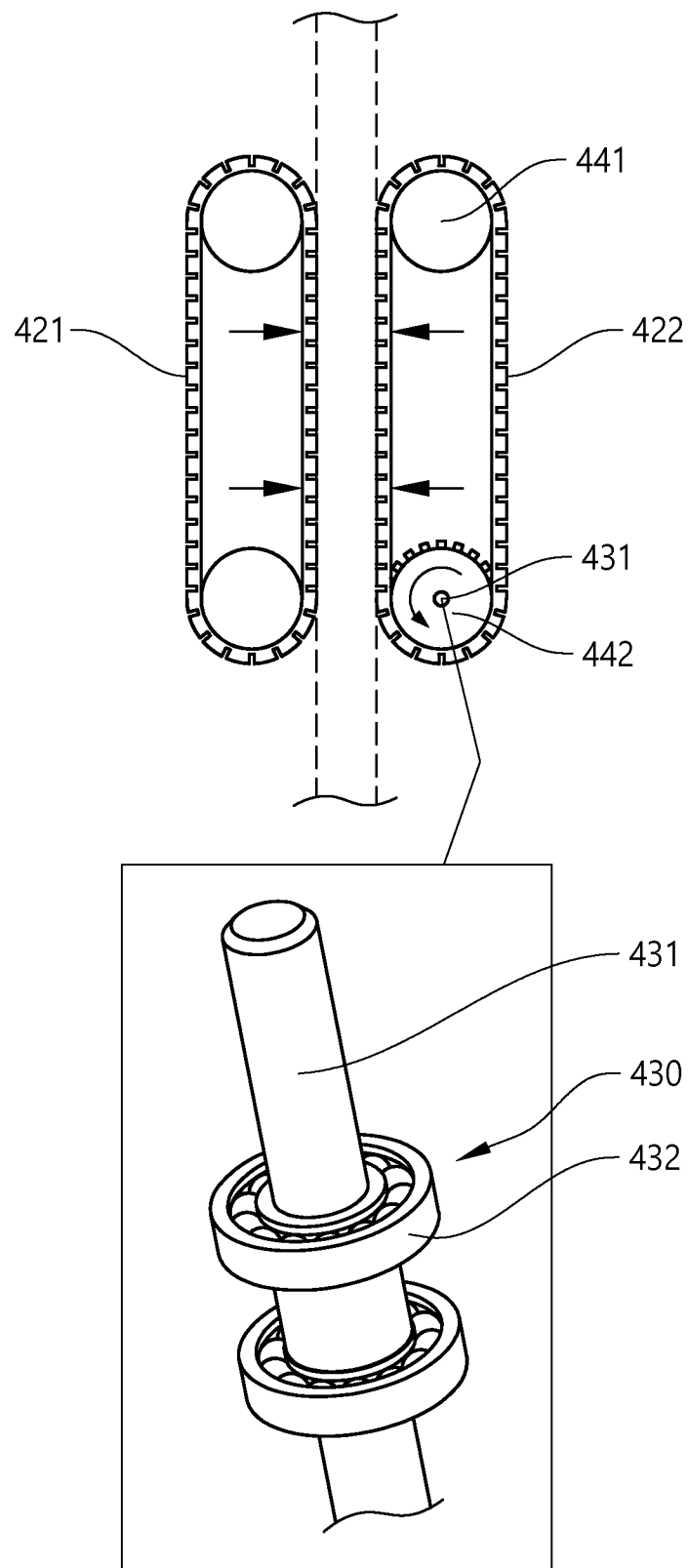


FIG. 5

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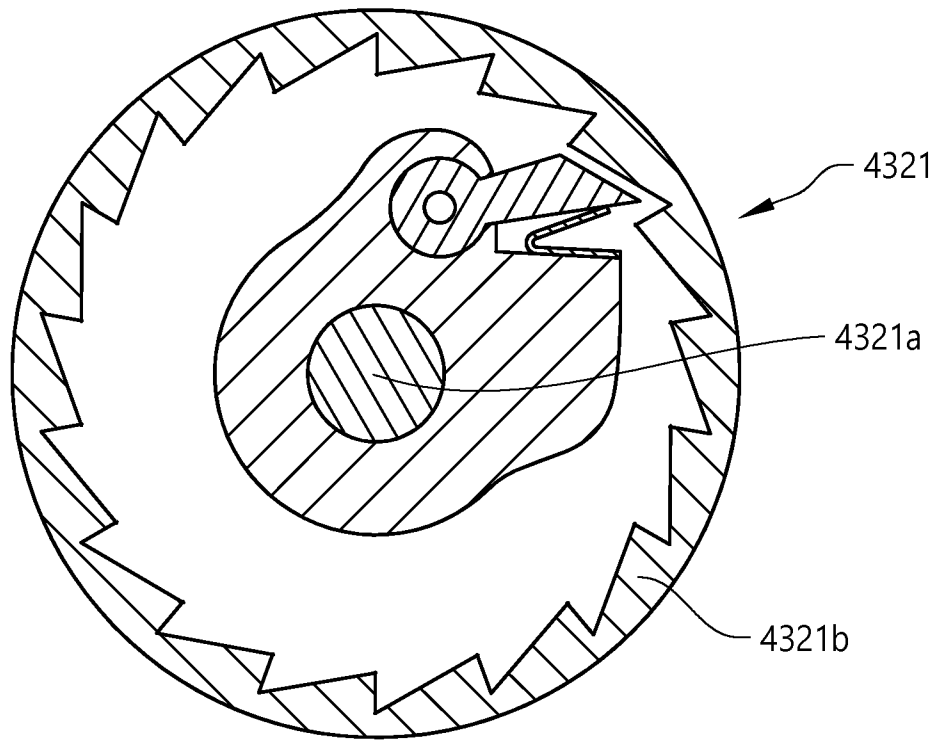


FIG. 6

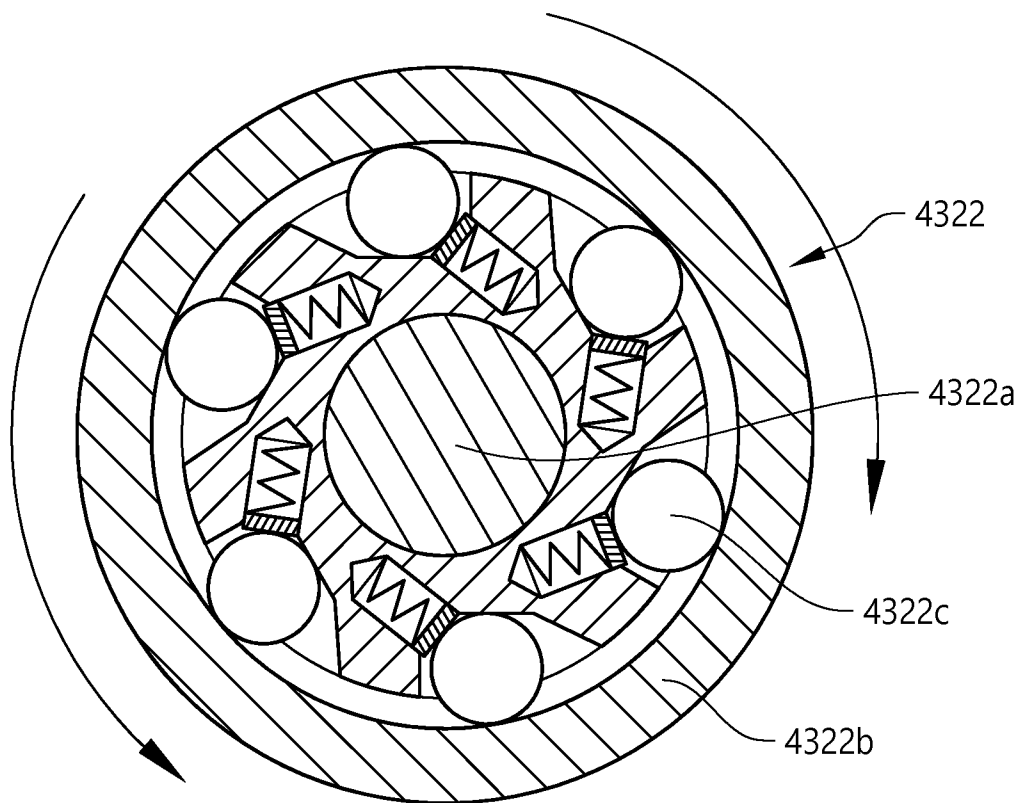


FIG. 7a

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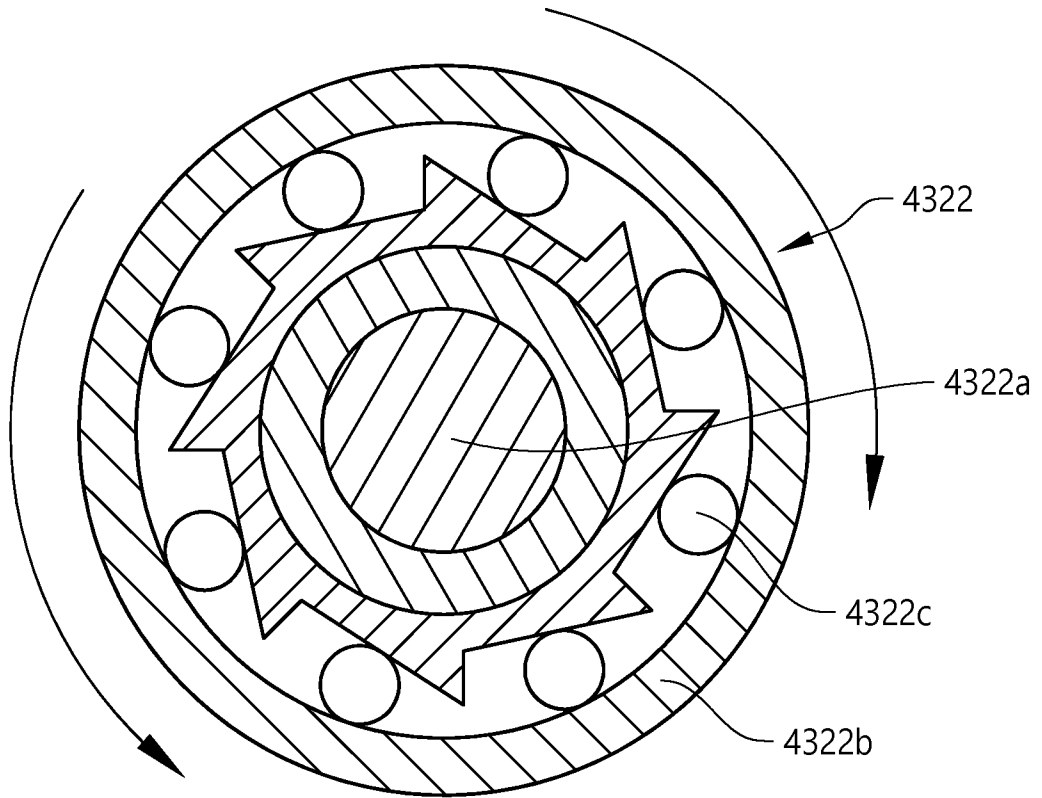


FIG. 7b

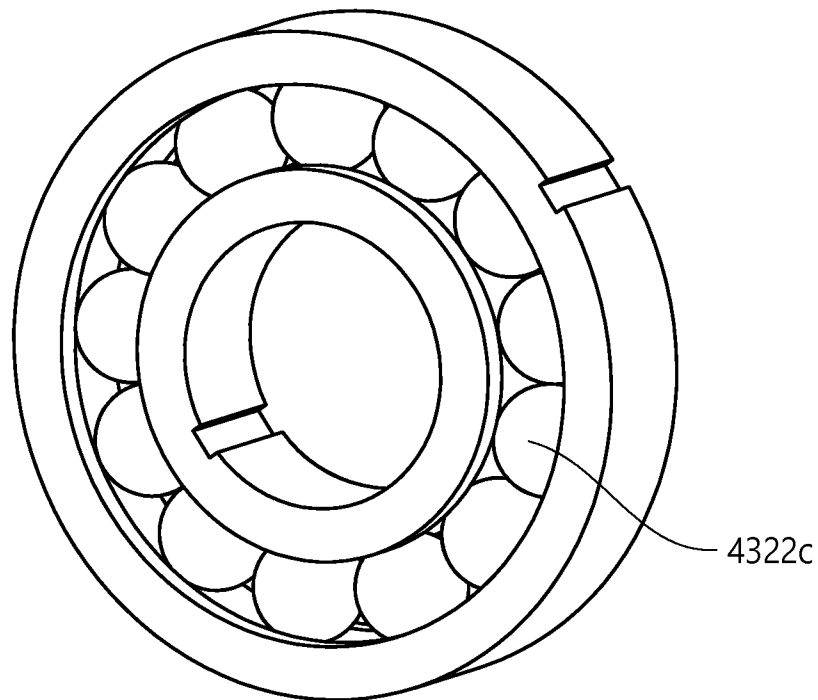


FIG. 7c

INTERNATIONAL SEARCH REPORT

International application No
PCT/SE2023/050690

A. CLASSIFICATION OF SUBJECT MATTER INV. B65H51/10 B65H75/42 B65H75/44 ADD.		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) B65H		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 669 145 A (KEHR EDWIN A [US]) 2 June 1987 (1987-06-02)	1, 7-18
Y	column 4, line 35 - line 52 column 6, line 38 - column 7, line 3 figures 1, 5 -----	2-6
Y	GB 2 156 643 A (HARVEY VERNON BRIAN WILLIAM) 16 October 1985 (1985-10-16) figure 2 -----	2-6
A	WO 2011/049747 A2 (CATERPILLAR INC [US]; YUET FU P [US] ET AL.) 28 April 2011 (2011-04-28) the whole document -----	1-18
A	EP 2 878 569 B1 (SEPSON AB [SE]) 1 June 2016 (2016-06-01) figures 1-3 -----	1-18
☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
<p>* Special categories of cited documents :</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>		
Date of the actual completion of the international search 4 January 2024		Date of mailing of the international search report 23/01/2024
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Guisan, Thierry

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/SE2023/050690

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4669145	A	02-06-1987	NONE	

GB 2156643	A	16-10-1985	FR 2561864 A1	04-10-1985
			GB 2156643 A	16-10-1985

WO 2011049747	A2	28-04-2011	AU 2010308407 A1	10-05-2012
			BR 112012009246 A2	06-06-2017
			CN 102639793 A	15-08-2012
			EP 2491187 A2	29-08-2012
			JP 2013508586 A	07-03-2013
			US 2011093170 A1	21-04-2011
			WO 2011049747 A2	28-04-2011

EP 2878569	B1	01-06-2016	NONE	
