



(11) **EP 4 244 459 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
18.09.2024 Bulletin 2024/38

(21) Application number: **21801250.8**

(22) Date of filing: **06.10.2021**

(51) International Patent Classification (IPC):
E21B 7/02^(2006.01) E21B 19/086^(2006.01)

(52) Cooperative Patent Classification (CPC):
E21B 7/025; E21B 19/086

(86) International application number:
PCT/SE2021/050977

(87) International publication number:
WO 2022/103311 (19.05.2022 Gazette 2022/20)

(54) **FEEDER ARRANGEMENT ON A DRILL RIG, AND DRILL RIG**

ZUFÜHRANORDNUNG AUF EINEM BOHRGESTELL UND BOHRGESTELL

ARRANGEMENT ALIMENTEUR SUR UN APPAREIL DE FORAGE, ET APPAREIL DE FORAGE

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

(30) Priority: **11.11.2020 SE 2051316**

(43) Date of publication of application:
20.09.2023 Bulletin 2023/38

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Description

TECHNICAL FIELD

[0001] The present disclosure relates to a feeder arrangement for a rock drilling machine and a drill rig comprising such a feeder arrangement. Specifically, the present disclosure relates to a drill rig and a feeder arrangement in which hydraulic fluid is provided to a hydraulic rock drilling machine on the drill rig.

BACKGROUND

[0002] In currently available drill rig configurations, one or more hydraulic rock drilling machines are arranged on feeder arrangements at outer ends of respective one or more booms that extend from the drill rig. Hoses to provide the feeder arrangement and/or hydraulic rock drilling machine with hydraulic fluid are arranged in reels or other types of hose suspension arrangements that offer flexibility, both for the movement of the hydraulic rock drilling machine with respect to the feeder arrangement, but also for the positioning of the feeder arrangement with respect to the boom.

[0003] However, such hose suspension arrangements are often both bulky and exposed to harsh conditions. In many cases the hoses may get tangled up, e.g., against a rock surface, resulting in hose ruptures. This is particularly troublesome when it happens to a hydraulic hose that supports an essential function of the feeder arrangement or the rock drilling machine. In those instances a rupture of hydraulic hose will most likely result in an operational stop.

[0004] A drill rig often comprises at least two separate feeders extending from separate booms, each feeder carrying a hydraulic rock drilling machine and the associated hydraulic hose suspension arrangements. A common problem is that these hydraulic hose suspension arrangements may hinder each other, which may further aggravate the above mentioned operational problems or hose ruptures and result in lengthy downtimes of the drill rig. Recent service evaluations indicate that 80% of the downtime of drill rig is due to problems related to the booms feeder arrangements. Further, 85% of the boom/feeder related problems occur due to damages on hydraulic hoses, including external damages and ruptures thereof.

[0005] Consequently, there is a need for a solution that reduces problems due to hose entanglement or leaks in the conduits providing the rock drilling machine with hydraulics.

[0006] US 4 039 032 A discloses a fluid actuated rock drilling apparatus comprising a plurality of flexible pressure fluid hoses to communicate between the drill and a pressure fluid source.

SUMMARY

[0007] It is an object of the present disclosure to provide a feeder arrangement and drill rig that seeks to mitigate or eliminate all or at least some of the above-discussed drawbacks of present solutions and reduces problems due to hose entanglement or leaks in the conduits.

[0008] This and other objects are achieved by means of a feeder arrangement and drill rig as defined in the appended claims. The term exemplary is in the present context to be understood as serving as an optional feature, example or illustration.

[0009] According to a first aspect of the present disclosure, a feeder arrangement for a hydraulic rock drilling machine on a drill rig is provided. The feeder arrangement comprises a feed beam with a first beam that comprises a first end block and a second end block at opposite ends thereof, i.e., at opposite ends of the first beam. The feeder arrangement further comprises a first pipe connection extending between the first end block and the second end block, and a rock drilling machine connector including at least a first connector port that is connectable to the rock drilling machine; the rock drilling machine connector being slidably arranged with respect to the first pipe connection. The first pipe connection is comprised in the feed beam and is fluidly connectable to a hydraulic arrangement on the drill rig via a first conduit passing through a first end of the first pipe connection and the first end block. The first pipe connection comprises a first fluid port to a first chamber of the rock drilling machine connector. The first connector port is in fluid connection with the first chamber via the first conduit to connect the rock drilling machine to the hydraulic arrangement on the drill rig and to provide pressurised hydraulic fluid to drive at least one consumer of the hydraulic rock drilling machine.

[0010] The disclosed feeder arrangement enables a providing of pressurized hydraulic fluid to the rock drilling machine via internal conduits, e.g., via rigid pipes, inside the feed beam wherein the risk of damages on the conduits caused by external factors is minimized.

[0011] In some embodiments, the feeder arrangement further comprises a connection device including at least a first hydraulic fluid port that is connectable to a hydraulic arrangement on the drill rig, and wherein the first chamber of the rock drilling machine connector is in fluid connection with the connection device via the first conduit.

[0012] The connection device provides the advantage of enabling simplified hydraulic connectivity, at any connection point along the feed beam, to the hydraulic arrangement on the drill rig.

[0013] In some embodiments, the connection device includes a second hydraulic fluid port that is connectable to the hydraulic arrangement on the drill rig and the rock drilling machine connector includes a second connector port that is connectable to the rock drilling machine. The second hydraulic fluid port and the second connector port

are fluidly connected via a second conduit passing through a second end of the first pipe connection and the second end block. The first pipe connection comprises a second fluid port that is connected to a second chamber of the rock drilling machine connector. The second conduit provides a return line from at least one consumer of the hydraulic rock drilling machine to the hydraulic arrangement on the drill rig.

[0014] This enables the conveying of a return flow without the use of external hoses.

[0015] In some embodiments, the first pipe connection comprises at least two parallel pipes extending between the first and second end blocks and providing separate hydraulic conduits via separate rock drilling machine connectors.

[0016] The provision of more than one individual pipe offers more conduits for providing or returning hydraulic fluid to or from the rock drilling machine, regardless of if the two ends, or only a first end, of the pipes are utilised to convey fluid.

[0017] In some embodiments, the first pipe connection comprises one or more rigid pipes extending between the first and second end blocks.

[0018] Thus, a hydraulic feed addressing the problems of hose tangling is provided.

[0019] In some embodiments, the rock drilling machine connector is a multi-stage connector also comprising an intermediate connector, wherein the intermediate connector is arranged to enclose a portion of the pipe connection and to slide in the axial direction with respect thereto, and the rock drilling machine connector is arranged to enclose a portion of the intermediate connector and to slide in the axial direction with respect to the intermediate connector; the first fluid port of the pipe connection being connected to the first chamber of the rock drilling machine connector via a first intermediate chamber of the intermediate connector, and the second fluid port of the pipe connection being connected to the second chamber of the rock drilling machine connector via a second intermediate chamber of the intermediate connector.

[0020] The described multi-stage connector is advantageous in that it substantially increases the possible movement of the rock drilling machine, between two outer positions close to the respective ends of the first beam. Thereby, short as well as longer drill rods may be used in the feeder arrangement.

[0021] In some embodiments of the feeder arrangement the first and the second intermediate chambers of the intermediate connector are separated by a partition, e.g., a piston, arranged circumferentially on the pipe connection, and wherein the first and the second chambers of the rock drilling machine connector are separated by a partition, e.g., a piston, arranged circumferentially on the intermediate connector.

[0022] In some embodiments, the feed beam comprises a second beam extending in a longitudinal direction of the first beam, wherein the first beam is arranged in sliding contact with the second beam between a com-

pacted position and an extended position in which it extends away in the longitudinal direction with respect to the second beam. A second pipe connection is arranged alongside the first pipe connection between the first and second end block of the first beam. Optionally, a connection device may be arranged at the second beam and the second pipe connection may be connected to the connection device to connect the hydraulic arrangement on the drill rig to the rock drilling machine, via at least the first conduit.

[0023] An extendable feed beam offers many advantages with regard to operational movement of the rock drilling machine in the axial direction. The second pipe connection provides an advantageous manner of combining the advantages of an extendable feed beam with an internal conduction of hydraulic fluid to and from a rock drilling machine.

[0024] In some embodiments, a hydraulic pressure source of the hydraulic arrangement on the drill rig is arranged to drive a percussion unit of the rock drilling machine via the first conduit line and wherein a return flow from the percussion unit is connectable via the second conduit line to a tank.

[0025] With this specific embodiment no external conduits are needed to drive a percussion unit of the rock drilling machine.

[0026] According to a second aspect of the present disclosure, a drill rig is provided. The drill rig comprises a boom and a feeder arrangement according to the first aspect. The drill rig further comprises a hydraulic arrangement including a hydraulic pressure source for feeding a rock drilling machine and a tank. The feeder arrangement is attached to an outer end of the boom and is hydraulically connected to the hydraulic arrangement via the boom.

[0027] Other embodiments, examples and advantages of the feeder arrangement and drill rig will be presented and further explained in the detailed description and the appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] The foregoing will be apparent from the following more particular description of example embodiments, as illustrated in the accompanying drawings in which like reference characters refer to the same parts throughout the different views. The drawings are not necessarily to scale, emphasis instead being placed upon illustrating the example embodiments.

Fig. 1 is a schematic view of a drill rig with three booms and respective feeder arrangements for respective rock drilling machines;

Figs. 2A-C exposes details of a feeder arrangement slidably carrying a rock drilling machine;

Fig. 3A-B discloses an extendable telescopic feeder

arrangement in an extended state;

Fig. 4A-B discloses an extendable telescopic feeder arrangement in a compacted state;

Figs. 5A-C show an extendable telescopic feeder arrangement in differing positions with regard to a feed holder;

Fig. 6 shows an example of a hydraulic assembly for providing hydraulic fluid to a rock drilling machine via a telescopic feeder arrangement;

Fig. 7 is a top view of an extendable telescopic feeder arrangement carrying a rock drilling machine;

Fig. 8 discloses a cut view of a telescopic feeder arrangement carrying a rock drilling machine;

Fig. 9 discloses an end block of a telescopic feeder arrangement carrying a rock drilling machine.

DETAILED DESCRIPTION

[0029] Fig. 1 discloses a drill rig 1, i.e., a rock drill rig. The drill rig comprises three booms 5A-5C equipped with individual rock drilling machines 3A-3C. The rock drilling machines 3A-3C are arranged on respective feeder arrangements 2A-2C comprising feed beams 10A-10C. Feed holders 47A-47C are arranged to connect the three booms 5A-5C to the respective feeder arrangements 2A-2C. In Fig. 1 it is illustrated how the three rock drilling machines 3A-3C operate by drilling individual drill strings 6A-6C into a rock face 8. As the rock drilling machines 3A-3C may advance their way into the rock face 8 they advance from a back end, i.e., first end block 11A-11C to a front end, i.e., second end block 12A-12C of the feed beams 10A-10C.

[0030] The drill rig 1 comprises a hydraulic arrangement 1' comprising at least a pressure source P and a tank T. The hydraulic arrangement 1' may include more than one pressure source, wherein at least one pressure source is a hydraulic pump adapted to provide a pressure to drive a percussion unit of the rock drilling machine and at least one pressure source is a hydraulic pump adapted to provide a flow to drive a rotation unit of the rock drilling machine. The hydraulic arrangement 1' is arranged to feed the different consumers of the rock drilling machines 3A-3C. Such consumers typically include at least a rotation unit, a percussion unit, and a damper unit. Further, the hydraulic arrangement 1' is arranged to provide hydraulic fluid to hydraulic motors such as hydraulic cylinders arranged to advance the rock drilling machines 3A-3C along the corresponding feeder arrangements 2A-2C. The conduits for the hydraulic fluid are conventionally arranged along or within the boom 5A-5C to the feed holders 47A-47C. As will be described in further detail below, the present disclosure provides improved feeder

arrangements 2A-2C comprising hydraulic conduits to supply hydraulic fluids to the consumers of the rock drilling machines 3A-3C.

[0031] Figs. 2A-2C exposes details of such an improved feeder arrangement 2. The feeder arrangement 2 is configured to carry a rock drilling machine 3 on a carrier 4. In the disclosure of Fig. 2A-2C, interior components of the feeder arrangement 2 are exposed. It will be obvious to the skilled person that the indicated first beam 14 may be comprised within a feed beam, i.e., within a longitudinally extending beam structure or cover surrounding the interior components exposed in Figure 2A-2C, e.g., in any of feed beams 10A-10C indicated in the disclosure of Fig. 1.

[0032] The first beam 14 comprises a first end block 11 and a second end block 12 at opposite ends thereof, i.e., at opposite ends of the first beam. The disclosed feeder arrangement 2 carries a rock drilling machine 3 arranged to operate in an axial direction A1 between the first end block 11 and the second end block 12. The first pipe connection 17 extends between the first end block 11 and the second end block 12 and may be comprised in a feed beam, also known as feeder, as disclosed in Figure 1. Thus, the first pipe connection 17 may constitute the first beam, form part of the first beam, or be enclosed by the first beam. A rock drilling machine connector 19 is slidably arranged with respect to the first pipe connection 17. The rock drilling machine connector 19 may be comprised in the carrier 4 or connected to the carrier 4. The first pipe connection 17 is fluidly connectable to a hydraulic arrangement on the drill rig via the first end block 11, e.g., via a first conduit passing through a first end of the first pipe connection and the first end block. The first pipe connection together with the rock drilling machine connector connect the rock drilling machine 3 to the hydraulic arrangement on the drill rig to provide pressurised hydraulic fluid to drive at least one consumer of the hydraulic rock drilling machine 3.

[0033] The feeder arrangement disclosed in Figs. 2A-C enables a providing of pressurized hydraulic fluid to the rock drilling machine via internal conduits, e.g., via rigid pipes, inside the feeder arrangement whereby the risk of damages on the conduits caused by external factors is minimized.

[0034] As illustrated in Fig. 2A-2C, the rock drilling machine is configured to be arranged on a carrier 4 slidably movable between positions along a feed beam having a first beam 14; first and second end blocks 11, 12 arranged at opposite ends of said first beam 14. In some examples, the first beam 14 may be comprised in the feed beam, i.e., within a longitudinally extending beam structure or cover surrounding the interior components, e.g., in any of the feed beams 10 A-10C indicated in the disclosure of Fig. 1. The first beam 14 includes a first pipe connection 17, comprised within the first beam. The first pipe connection 17 may be enclosed by the first beam or forming part of the first beam 14. As is illustrated in the drawings and specified with individual reference numerals in Fig.

2A-2C the first pipe connection 17 may comprise at least two parallel pipes 17A, 17B extending between the first and second end blocks 11, 12 and providing separate hydraulic conduits via separate rock drilling machine connectors 19. The number of pipes may of course be adapted to the desired number of conduits needed to provide the rock drilling machine 3 with hydraulic fluids.

[0035] In Fig. 2A the rock drilling machine 3 is positioned in a most retracted position at the first end block 11 at a back end of the first beam 14, in Fig. 2B the rock drilling machine 3 is positioned in an intermediate position and in Fig. 2C the rock drilling machine 3 is positioned in a most forward position at the second end block 12 at a front end of the first beam 14. A drill support 13 is arranged at the second end block 12 to support a drill string that extends from the rock drilling machine 3 during operation.

[0036] The rock drilling machine 3 and the carrier 4 are movably arranged with respect to the first beam 14 in a first direction A1 along a first pipe connection 17. The first pipe 17A and the second pipe 17B of the first pipe connection 17 extend along the first direction A1 from the first end block 11 to the second end block 12 and are fluidly connected to a hydraulic arrangement on a drill rig as illustrated in Fig. 1. The hydraulic arrangement on the drill rig may be connected to the feeder arrangement via at least a first end of the first pipe connection 17 and via the first and/or the second end block 11, 12. Optionally, the hydraulic arrangement on the drill rig may be connected to the feeder arrangement via a connection device 7. Such a connection device provides the advantage of enabling simplified hydraulic connectivity, at any connection point along the feed beam, to the hydraulic arrangement on the drill rig. The connection device may comprise a first hydraulic fluid port P_1 that is connectable to a hydraulic arrangement on the drill rig. In some examples, the connection device is a part of one of the end blocks 11, 12 or arranged in the vicinity of one of the end blocks 11, 12, to connect the first pipe connection 17 to the hydraulic arrangement on a drill rig via said end block 11 or 12, and via the respective end of the first pipe connection 17 to the rock drilling machine 3 via an intermediate connector 18 and the rock drilling machine connector 19. In such an arrangement, a pressurised hydraulic fluid may be provided via the first pipe 17A, a first intermediate connector 18A and a first rock drilling machine connector 19A, wherein the return may be provided via a second rock drilling machine connector 19B, a second intermediate connector 18B and a second pipe 17B to the hydraulic arrangement 1' on the drill rig 1 via said connection device at the end block 11 or 12.

[0037] The carrier 4, configured to carry the rock drilling machine 3, is arranged to slide on the first beam 14 with respect to the first pipe connection 17, e.g., to slide on the first pipe connection itself. The rock drilling machine 3 is arranged to receive a hydraulic fluid via the first pipe connection 17 and a rock drilling machine connector 19. The intermediary connector 18 is configured to enclose

a portion of the first pipe connection 17. The rock drilling machine connector 19 is arranged outside the intermediate connector 18, enclosing the intermediate connector 18 and the first pipe connection 17.

[0038] The intermediate connector 18 is arranged to enclose a portion of the first pipe connection 17 and arranged to slide with respect to the first pipe connection 17, thereby functioning as a double acting cylinder. The rock drilling machine connector 19, which is connected to the rock drilling machine 3, may also function a double acting cylinder. The rock drilling machine connector 19 is arranged to enclose a portion of the intermediate connector 18 and arranged to slide with respect thereto. In its most basic configuration, the rock drilling machine connector 19 includes a first connector port in fluid connection with a first chamber, e.g., a first chamber in an intermediate connector 18, via a first conduit connecting the rock drilling machine to the hydraulic arrangement on the drill rig. Optionally, a connection device, including at least a first hydraulic fluid port that is connectable to a hydraulic arrangement on the drill rig, may be comprised in the feeder arrangement and configured to be in fluid connection with the rock drilling machine connector 19. The first pipe connection 17 comprises a first fluid port to a first chamber of the rock drilling machine connector 19 and the first connector port is in fluid connection with the first chamber via the first conduit, and optionally the connection device 7, to connect the rock drilling machine 3 to the hydraulic arrangement on the drill rig and to provide pressurised hydraulic fluid to drive at least one consumer of the hydraulic rock drilling machine. In the embodiment of Figure 2A, the hydraulic fluid connection is provided from the first and/or the second end block 11, 12, e.g., serving as the above mentioned connection device, via the first pipe connection 17, and the rock drilling machine connector 19, to the rock drilling machine 3. As will be recognized by the skilled person, the disclosed configuration allows for pressurised hydraulic fluid to be provided to at least one consumer of the hydraulic rock drilling machine regardless of the current position of the rock drilling machine 3, and hence, regardless of the mutual positions of the first pipe connection 17 and the rock drilling machine connector 19.

[0039] As further illustrated in Fig. 2A, the first pipe connection may comprise at least two parallel pipes 17A, 17B extending between the first and second end blocks 11, 12 and providing separate hydraulic conduits via separate rock drilling machine connectors 19A, 19B; the rock drilling machine connectors at least partially enclosing first and second intermediate connectors 18A, 18B. The first intermediate connector 18A and a first rock drilling machine connector 19A are arranged on the first pipe 17A of the first pipe connection 17, and the second intermediate connector 18B and a second rock drilling machine connector 19B are arranged on the second pipe 17B. The feeder arrangement 2 of the shown embodiment thereby provides at least two conduits for hydraulic fluid to or from the rock drilling machine 3. The first conduit

is provided via the first pipe 17A, the intermediate connector 18A and the first rock drilling machine connector 19A and the second conduit via the second pipe 17B, the second intermediate connector 18B and a second rock drilling machine connector 19B; the two conduits being provided regardless of a current position of the rock drilling machine connector 19 with respect to the intermediate connector 18 and regardless of a current position of the intermediate connector 18 with respect to the first pipe connection 17. Further, in specific embodiments, conduits may be provided from both the first and the second end blocks 11, 12 via the first pipe connection 17, the intermediate connector 18 and the rock drilling machine connector 19 to the rock drilling machine 3, such that four individual conduits are provided to the rock drilling machine 3.

[0040] Figs. 3A-B, and Figs. 4A-B disclose an extendable telescopic feeder arrangement 2 wherein a rock drilling machine 3 and a carrier 4 are arranged on an extendable feed beam 10. In addition to a first beam 14, the extendable feed beam 10 comprises a second beam 15 extending in a longitudinal direction A1 of the first beam 14. The first beam 14 is arranged in sliding contact with the second beam 15 between an extended state, illustrated in Figs. 3A-B, and a compacted state, illustrated in Figs. 4A-B.

[0041] Turning to Fig. 3A, the extendable feeder arrangement 2 is disclosed in an extended state. The first beam 14 extends away in the first direction A1 with respect to the second beam 15. A second pipe connection 21 is arranged alongside the first pipe connection 17 between the first and second end blocks 11, 12 of the first beam 14. A connection device 7 is arranged at the second beam 15 and connected to the second pipe connection 21 to connect to the hydraulic arrangement on the drill rig, e.g., via the first conduit. The feeder arrangement comprises carrier 4 arranged on an extendable feed beam 10 to carry a rock drilling machine 3. As illustrated, the rock drilling machine is configured to be arranged on a carrier 4 slidably movable between positions along an extendable feed beam comprising a first beam 14 and a second beam 15 extending in a longitudinal direction A1 of the first beam 14. The first beam 14 is arranged in sliding contact with the second beam 15 between a compacted position and the disclosed extended position in which it extends away in the first direction A1 with respect to the second beam 15. The first beam 14 comprises first and the second end blocks 11, 12, arranged at opposite ends of said first beam 14. The second beam 15 comprises a connection device including at least a first hydraulic fluid port that is connectable to a hydraulic arrangement on the drill rig and being fluidly connected to a first chamber via the first conduit.

[0042] In a drilling operation the rock drilling machine 3 starts from the back-end position and advances toward a front end 23 of the extendable feed beam 10 where a front support 16 may be arranged to guide a further extension of the drill string 6. This advancement may be

performed in steps. For instance a first advancement step may be achieved by compacting the extendable feed beam 10 and aligning the first and the second beams 14, 15. As a subsequent advancement step the rock drilling machine 3 may be advanced with respect to the first beam 14. The compaction of the extendable feed beam 10 and the advancement of the rock drilling machine 3 may be performed in the opposite order, or simultaneously where the rock drilling machine 3 is advanced with respect to the first beam 14 at the same time as the feed beam 10 is compacted.

[0043] The movement of the drilling machine 3 with respect to the first pipe connection 17 may also be made in steps in that firstly the intermediate connector 18 slides with respect to the first pipe connection 17, and secondly the rock drilling machine connector 19 slides with respect to the intermediate connector 18. The movement of the intermediate connector 18 and the rock drilling machine connector 19 may also be performed in the opposite order, or simultaneously in an overlapping movement.

[0044] Fig. 4A discloses the extendable feeder arrangement 2 in a compacted state, wherein the second beam is adjacent to the first beam. A second pipe connection 21 is arranged alongside the first pipe connection 17 between the first and second end blocks 11, 12 of the first beam 14. A connection device 7 is arranged at the second beam 15 and connected to the second pipe connection 21 to connect to the hydraulic arrangement on the drill rig, e.g., via the first conduit. As illustrated, the rock drilling machine is configured to be arranged on a carrier 4. The first beam 14 is arranged in sliding contact with the second beam 15. The first beam 14 comprises first and second end blocks 11, 12, arranged at opposite ends of said first beam 14. The second beam 15 comprises a connection device 7, i.e., a connection device including at least a first hydraulic fluid port that is connectable to a hydraulic arrangement on the drill rig and being fluidly connected to a first chamber via the first conduit.

[0045] In a drilling operation the rock drilling machine 3 starts from the back-end position and advances toward a front end 23 of the extendable feed beam 10 where a front support 16 may be arranged to guide a further extension of the drill string 6. During an advancement step, the rock drilling machine 3 may be advanced with respect to the first beam 14.

[0046] Figs. 3B and 4B exposes the internal structures of the extendable feeder arrangement. As illustrated, a first pipe connection 17 and a second pipe connection 21 are comprised in first and second feed beams 14, 15. In some examples, the first and second pipe connection 17, 21 both extend between the first end block 11 and the second end block 12 of the second beam 15. In the shown example, the second pipe connection 21 includes two separate pipes 21A and 21B extending alongside the first pipe 17A and the second pipe 17B of the first pipe connection 17. The number of pipes may however be adapted to the number of conduits needed for the

specific application. For a hydraulic rock drilling machine four separate hydraulic conduits may be sufficient. However, the pipe connections 17 and 21 may also be supplemented with pipes or hoses for providing water, air and/or lubrication to the drilling machine.

[0047] Further, in addition to providing hydraulic fluid to the rock drilling machine 3, the pipe connections 17 and 21 may also be utilized to move the rock drilling machine 3 during and between rock drilling operations. Specifically, the second pipe connection 21 may be utilised to control the extension of the feed beam 10 by moving the first beam 14 with respect to the second beam 15. The second pipe connection 21 comprises one or more conduits for providing pressurised hydraulic fluid from the connection device 7 to the first pipe connection 17 via at least one of the first and second end blocks 11, 12 of the first beam 14.

[0048] As illustrated, in Figs 3B and 4B, the second pipe connection 21 may be fluidly connected to the connection device 7. The connection device may be immovable with respect to the second beam 15, and at the same time the second pipe connection 21 may be arranged to slide with respect to the connection device 7. In some examples, the connection device is suspended in flexible manner. In some examples, the connection device 7 is connected to the second pipe connection 21 via a pipe connector 22, comprising a first and second chamber. A first and a second port may be provided in the second pipe connection 21 on opposite sides of a partition thereof, the first port connecting the first hydraulic fluid port of the connection device 7 to the first conduit in the first end of the second pipe connection 21 via the first chamber. The second port may connect the second hydraulic fluid port of the connection device 7 to the second conduit via the second end of the second pipe connection 21 via the second chamber. Details of the connection device will be further explained below with reference to the disclosure of Fig. 6.

[0049] Figs. 5A-C show a feeder arrangement 2, i.e., a telescopic feeder arrangement, as connected to a feed holder 47. The feeder arrangement 2 comprises an extendable feed beam 10 with a first beam 14 and a second beam 15; the first and second beam 14, 15 extending in a longitudinal direction A1 of the first beam 14. The first beam 14 is arranged in sliding contact with the second beam 15 between a compacted state and an extended state. In the extended state, the first beam extends away in the first direction A1 with respect to the second beam. The feeder arrangement further comprises first and second end blocks 11, 12 at respective ends of the first beam 14. A connection device 7 is arranged at the second beam 15. In some examples, the connection device may be arranged in the feed holder 47. The connection device is configured to receive a hydraulic fluid from the drill rig, e.g., by means of the hydraulic fluid connection to an outer end of the boom. An exemplary hydraulic fluid connection is disclosed between the feed holder 47, which is configured to be attached to an outer end of a boom 5

(see Fig. 1), and the extendable feeder arrangement. Connective lines, including at least two hydraulic hoses 48, are arranged to connect conduits from the hydraulic arrangement on the drill rig, via the boom, to the feed beam 10. In Fig. 5A the second beam 15 of the feed beam 10 is at its foremost position with respect to the feed holder 47, i.e., at the front end 23 of the feed beam 10 when the feed beam is in its most distant position with respect to the feed holder 47. In this position, the hydraulic hoses 48 extend forward from the feed holder 47. In Fig. 5B the second beam 15 of the feed beam 10 is centrally positioned with respect to the feed holder 47, wherein the hydraulic conduits 48 extend in a curved formation to the connection device 7 which is here positioned immediately above the feed holder 4 and in Fig. 5C the second beam 15 of the feed beam 10 is in its most retracted position with respect to the feed holder 47, wherein the hydraulic conduits 48 extend backwards from the feed holder 47 to the connection device 7. The hydraulic hoses 48 are preferably arranged in a shielded manner, e.g. inside a housing of the feed holder 47.

[0050] Fig. 6 shows details of an example hydraulic configuration comprising first and second hydraulic assemblies 20 and 24 for providing hydraulic fluid to a rock drilling machine 3 via a telescopic feeder arrangement. The hydraulic configuration accomplishes the provision of hydraulic fluid to and from one or more of the consumers 53, 54, 55 of the hydraulic rock drilling machine 3, e.g., to and from a percussion unit, a damper unit, and/or a rotation unit.

[0051] The upper part of Fig. 6 shows the first hydraulic assembly 20 in which pressurized hydraulic fluid is conveyed to the rock drilling machine 3 via a rock drilling machine connector 19 that is slidably arranged with respect to the first pipe connection 17. A first end block 11 and a second end block 12 are provided at opposite ends of a first pipe connection 17. The pressurized hydraulic fluid is conveyed in a first conduit 30A through a first end of a first pipe connection 17, and is allowed to escape to tank T via a second conduit 30B through an opposite second end of the first pipe connection 17. The provisioning of the pressurized hydraulic fluid allows the rock drilling machine connector 19 to advance with respect to the first pipe connection 17, e.g., by advancing an intermediate connector 18.

[0052] The rock drilling machine connector 19 includes a first connector port P_A , and optionally a second connector port P_B , connectable to the rock drilling machine 3. The first and the second connector ports P_A , P_B may be integrated parts of the rock drilling machine connector 19. The first pipe connection 17 comprises one or more rigid pipes extending between the first and second end blocks 11, 12. The first pipe connection 17 is fluidly connectable to a hydraulic arrangement 1' on the drill rig via the first conduit 30A passing through the first end of the first pipe connection 17 and the first end block 11. The first pipe connection 17 comprises a first fluid port 38A to the rock drilling machine connector 19. The first

connector port P_A is in fluid connection with a first chamber 27A via the first conduit 30A to connect the rock drilling machine to the hydraulic arrangement 1' on the drill rig and to provide pressurised hydraulic fluid to drive at least one consumer 53, 54, 55 of the hydraulic rock drilling machine 3. Hence, the feeder arrangement 2 makes it possible to provide pressurised hydraulic fluid to drive at least one consumer 53, 54, 55, via internal conduits.

[0053] In the example hydraulic configuration disclosed in Figure 6, the rock drilling machine connector 19 is a multi-stage connector also comprising an intermediate connector 18 configured to enclose a portion of the first pipe connection 17. The rock drilling machine connector 19 is in turn arranged to enclose the intermediate connector 18 and to slide in the axial direction with respect to the intermediate connector 18. The first fluid port 38A of the first pipe connection 17 is connected to the first chamber 27A of the rock drilling machine connector 19 via a first intermediate chamber 26A of the intermediate connector 18, and a second fluid port 38B of the first pipe connection 17 is connected to a second chamber 27B of the rock drilling machine connector 19 via a second intermediate chamber 26B of the intermediate connector 18. The first and the second intermediate chambers 26A, 26B of the intermediate connector 18 are separated by a partition 28, e.g., piston, arranged circumferentially on the pipe connection 17. The first and the second chambers 27A, 27B of the rock drilling machine connector 19 are separated by a partition 37, e.g., piston, arranged circumferentially on the intermediate connector 18.

[0054] The intermediate chamber 26A may be provided between a sealing 31A at an outer end of the intermediate connector 18 and a sealing 31B at a first end of a partition 28, which is fixed around a central part of the first pipe connection 17. The partition 28, e.g., piston, divides the first pipe connection 17 into first and second intermediate chambers 26A and 26B, respectively, positioned at opposite sides of the partition 28. When the first intermediate chamber 26A is filled with pressurized hydraulic fluid the pressure may act to push the sealing 31A and the sealing 31B away from each other.

[0055] The movement of the rock drilling machine 3 with respect to the first pipe connection 17 may be performed in steps in that firstly the intermediate connector 18 slides with respect to the first pipe connection 17, and secondly the rock drilling machine connector 19 slides with respect to the intermediate connector 18. The movement of the intermediate connector 18 and the rock drilling machine connector 19 may also be performed in the opposite order, or simultaneously in an overlapping movement.

[0056] The lower part of Fig. 6 discloses the second hydraulic assembly 24 comprising a connection device 7 configured to receive pressurized hydraulic fluid from a hydraulic arrangement 1' on the drill rig to the feeder arrangement. In the example configuration, the connection device 7 further comprises a pipe connector 22 that

may form a part of the connection device 7 or be connected thereto. The pipe connector 22 comprises a first hydraulic fluid port P_1 , and optionally a second hydraulic fluid port P_2 , connectable to the hydraulic arrangement 1' on the drill rig.

[0057] In the disclosed example hydraulic configuration, the second hydraulic fluid port P_2 and the second connector port P_B are fluidly connected via the second conduit 30B passing through the second end of the first pipe connection 17 and the second end block 12. The second conduit 30B may provide a return line from one or more of the consumers 53, 54, 55 of the hydraulic rock drilling machine to the hydraulic arrangement 1' on the drill rig.

[0058] The connection device may be connected to a second pipe connection 21 via the pipe connector 22, i.e., to a second hydraulic assembly 24. The second pipe connection 21 is slidably arranged with respect to the pipe connector 22 and the connection device 7. The pipe connector 22 may comprise a first and second chamber 25A, 25B. A first and a second port 39A, 39B may be provided in the second pipe connection 21 on opposite sides of a partition 29, e.g., a piston, the first port 39A connecting the first hydraulic fluid port P_1 of the connection device 7 to the first conduit 30A in the first end of the second pipe connection 21 via the first chamber 25A; the second port 39B connecting the second hydraulic fluid port P_2 of the connection device 7 to the second conduit 30B via the second end of the second pipe connection 21 via the second chamber 25B. In an optional, non-disclosed, configuration, the first hydraulic fluid port P_1 of the connection device 7 may be connected to the second conduit 30B and the second hydraulic fluid port P_2 of the connection device may be connected to the first to the first conduit 30A.

[0059] In the example hydraulic configuration of Figure 6, pressurized hydraulic fluid may be conveyed to the rock drilling machine 3 through the first conduit 30A and allowed to escape to tank T through the second conduit 30B and. Thus, a hydraulic pressure source P of the hydraulic arrangement 1' on the drill rig 1 may drive a consumer 53, 54, 55 of the rock drilling machine 3 via the first conduit 30A and a return flow from the rock drilling machine 3 is connectable to tank T via the second conduit 30B.

[0060] A first sealing 33A may be arranged on the pipe connector 22 that is fixed with respect to the connection device 7, wherein the second sealing 33B is arranged on a partition 29, which may be fixed to the second pipe connection 21. The pressurized hydraulic fluid in 25A may act to push the second pipe connection 21 to the right in the drawing. Further, as is illustrated by the conduits 30A and 30B, the hydraulic fluid may be conveyed from the first and second chambers 25A or 25B to opposite sides of the pipe connection 17. Hence, the first and second conduits 30A and 30B connect respective sides of the disclosed hydraulic configuration, i.e., connecting the first hydraulic assembly 20 and the second hydraulic

assembly 24 to each other via the first and second end blocks 11, 12, respectively.

[0061] In some examples, pressurized hydraulic fluid to drive a consumer 53, 54, 55 of the hydraulic rock drilling machine 3 is conveyed thereto via the first conduit 30A that passes through the first chamber 25A of the second hydraulic assembly 24 and the first chamber 27A and the first intermediate chamber 26A of the first hydraulic assembly 20. A return flow of the hydraulic fluid from the consumer is conveyed via the second conduit 30B that passes through the second intermediate chamber 26B and the second chamber 27B, opposite to the first chamber 27A, and through the second hydraulic assembly 24, through a second chamber 25B, opposite to the first chamber 25A of the second hydraulic assembly 24.

[0062] Hence, first and the second hydraulic assemblies 20 and 24 may be arranged in series with each other to accomplish the provision of hydraulic fluid to and from one or more of the consumers 53, 54, 55 of the hydraulic rock drilling machine 3, e.g., to and from the percussion unit, the damper unit, and/or the rotation unit.

[0063] In the example of Fig. 6, a separate, non-illustrated, drive motor may be arranged to control the extension/retraction of the feed beam and/or the moving of the rock drilling machine 3.

[0064] Fig. 7 discloses a top view of an extendable telescopic feeder arrangement carrying a rock drilling machine. In Fig. 7 the first beam 14 is shown from above with a flexible hydraulic hose 46 arranged to be connected from the connection device 7 to the rock drilling machine 3. The hydraulic hose 46 is preferably arranged inside the first beam 14, and to follow the movement of the rock drilling machine 3 along the first beam 14.

[0065] Fig. 8 discloses a first beam 14 comprising a first and a second void 49, 50, respectively, that extend along at least a part of the length of the first beam 14. These voids 49, 50 may be utilised to house conduits in the form of hoses for conveying water, air, lubricant, or additional hydraulic fluid to or from the rock drilling machine 3, such as the hydraulic hose 46 shown in Fig. 7.

[0066] In Fig. 8 an extendable feeder arrangement for a rock drilling machine 3 is disclosed in a cut view. The feeder arrangement includes a first beam 14 comprising a first pipe connection comprising individual pipes 17A, 17B. A rock drilling machine connector 19 is connectable to the rock drilling machine 3 by means of a first connector port. The rock drilling machine connector 19 is slidably arranged with respect to the first pipe connection 17. The first pipe connection 17 is fluidly connectable to a hydraulic arrangement on the drill rig. A second beam 15 comprises a second pipe connection comprising individual pipes 21A, 21B. A rock drilling machine 3 is arranged to slide with respect to the first beam 14 along a slit 60 that extends along the length of the first beam 14. The rock drilling machine 3 is connected to a rock drilling machine connector 19, so as to slide therewith outside the intermediate connector 18, which in turn is arranged to slide with respect to the first and the second pipes 17A, 17B

of the first pipe connection 17 as described above.

[0067] Fig. 8 further illustrates how the first and second beam 14 and 15 are arranged with respect to each other and how a third and a fourth pipe 21A and 21B, both of the second pipe connection 21, may be housed inside the second beam 15, although they extend between the first and second blocks 11 and 12 of the first beam 14. Also, a separate conduit 59 may be arranged between the third and fourth pipes 21A and 21B. This separate conduit 59 may be a pressure equilibrated conduit, e.g., configured to provide a hydraulic flow to drive a consumer of the rock drilling machine 3. Instead of the separate conduit 59 a hydraulic cylinder may be arranged in this space. Such a hydraulic cylinder could e.g. be arranged to govern the extension and retraction of the extendable feed beam 10. Also, a separate hydraulic cylinder may be arranged to drive the movement of the rock drilling machine 3.

[0068] Fig. 9 discloses the second end block 12 of the first beam 14. The first end block 11 may be similar or identical to the second end block 12. As is illustrated the end block 12 comprises a first and a second end block connection 51, 52 that connects the first pipe 17A to the third pipe 21A and the second pipe 17B to the fourth pipe 21B. This is one of many possible embodiments of an end block. The end block may be comprised of pipes for further connection of the first pipe connection 17. In the shown embodiment of the telescopic feed beam 10, end block connection 51, 52 which may take any form and may include valves or cross connections for providing further possibilities of connections between the hydraulic fluid ports P_1 and P_2 and the connector ports P_A and P_B . **[0069]** Thereby, the individual pipes 17A, 17B, 21A, 21B that extend between the first and second end blocks 11, 12 of the first beam 14 provide at least four individual hydraulic conduits, which are interconnected via respective end block connections 51, 52 of the respective end blocks 11, 12 to the rock drilling machine 3.

[0070] The first conduit is provided from the connection device 7 to a first end of the third pipe 21A via the first end block 11 to a first end of the first pipe 17A. The second conduit is provided from the connection device 7 to a second end of the third pipe 21A via the second end block 12 to a second end of the first pipe 17A. A third conduit (not shown) may be provided from the connection device 7 to a first end of the fourth pipe 21B via the first end block 11 to a first end of the second pipe 17B. A fourth conduit (not shown) may be provided from the connection device 7 to a second end of the fourth pipe 21B via the second end block 12 to a second end of the second pipe 17B.

[0071] In specific embodiments the third conduit or the fourth conduit may be used to convey a return flow from a consumer of the rock drilling machine 3 via to tank T. The flow to drive the consumer 54 may be provided in the other of the third conduit or fourth conduit, or preferably via a separate line, because if the flow to drive the consumer 54 were conveyed in any of the pipes 17A,

17B, 21A, 21B the flow could give rise to unwanted vibrations. The separate line may either be a pressure equilibrated conduit 59 or a hydraulic hose 46 shown in Fig 7 and arranged inside the feed beam 10, e.g. in one of the longitudinal voids 49,50 as illustrated in Fig 8.

[0072] The description of the example embodiments provided herein have been presented for purposes of illustration. The description is not intended to be exhaustive or to limit example embodiments to the precise form disclosed; modifications and variations are possible in light of the above teachings or may be acquired from practice of various alternatives to the provided embodiments. The examples discussed herein were chosen and described in order to explain the principles and the nature of various example embodiments and its practical application to enable one skilled in the art to utilize the example embodiments in various manners and with various modifications as are suited to the particular use contemplated. It should be appreciated that the example embodiments presented herein may be practiced in combination with each other.

[0073] Generally, all terms used herein are to be interpreted according to their ordinary meaning in the relevant technical field, unless a different meaning is clearly given and/or is implied from the context in which it is used.

[0074] Reference has been made herein to various embodiments. However, a person skilled in the art would recognize numerous variations to the described embodiments that would still fall within the scope of the claims.

[0075] Any feature of any of the embodiments disclosed herein may be applied to any other embodiment, wherever suitable. Likewise, any advantage of any of the embodiments may apply to any other embodiments, and vice versa.

[0076] In the drawings and specification, there have been disclosed exemplary aspects of the disclosure. However, many variations and modifications can be made to these aspects without substantially departing from the principles of the present disclosure. Thus, the disclosure should be regarded as illustrative rather than restrictive, and not as being limited to the particular aspects discussed above. Accordingly, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation.

[0077] Hence, it should be understood that the details of the described embodiments are merely examples brought forward for illustrative purposes, and that all variations that fall within the scope of the claims are intended to be embraced therein.

Claims

1. A feeder arrangement (2) for a rock drilling machine (3) on a drill rig (1), which feeder arrangement comprises:

- a feed beam (10) with a first beam (14) that

comprises a first end block (11) and a second end block (12) at opposite ends thereof,

- a first pipe connection (17) extending between the first end block (11) and the second end block (12), and

- a rock drilling machine connector (19) including at least a first connector port (P_A) that is connectable to the rock drilling machine (3), the rock drilling machine connector (19) being slidably arranged with respect to the first pipe connection (17),

wherein the first pipe connection (17) is comprised in the feed beam (10) and is fluidly connectable to a hydraulic arrangement (1') on the drill rig (1) via a first conduit (30A) passing through a first end of the first pipe connection (17) and the first end block (11), the first pipe connection (17) comprising a first fluid port (38A) to a first chamber (27A) of the rock drilling machine connector (19); and wherein the first connector port (P_A) is in fluid connection with the first chamber (27A) via the first conduit (30A) to connect the rock drilling machine (3) to the hydraulic arrangement (1') on the drill rig (1) and to provide pressurised hydraulic fluid to drive at least one consumer (53, 54, 55) of the hydraulic rock drilling machine (3).

2. The feeder arrangement (2) according to claim 1, further comprising a connection device (7) including at least a first hydraulic fluid port (P_1) that is connectable to a hydraulic arrangement (1') on the drill rig (1), and wherein the first chamber (27A) of the rock drilling machine connector is in fluid connection with the connection device (7) via the first conduit (30A).

3. The feeder arrangement (2) according to claim 2, wherein the connection device (7) includes a second hydraulic fluid port (P_2) that is connectable to the hydraulic arrangement (1') on the drill rig (1) and the rock drilling machine connector (19) includes a second connector port (P_B) that is connectable to the rock drilling machine (3), and wherein the second hydraulic fluid port (P_2) and the second connector port (P_B) are connected via a second conduit (30B) passing through a second end of the first pipe connection (17) and the second end block (12), the first pipe connection (17) comprising a second fluid port (38B) that is connected to a second chamber (27B) of the rock drilling machine connector (19), the second conduit (30B) providing a return line from at least one consumer (53, 54, 55) of the hydraulic rock drilling machine (3) to the hydraulic arrangement (1') on the drill rig (1).

4. The feeder arrangement (2) according to claim 3, wherein the pipe connection further comprises a partition (37) that separates the first chamber (27A) from the second chamber (27B).

5. The feeder arrangement (2) according to any one of the preceding claims, wherein the first pipe connection (17) comprises at least two parallel pipes (17A, 17B) extending between the first and second end blocks (11, 12) and providing separate hydraulic conduits via separate rock drilling machine connectors (19A, 19B). 5
6. The feeder arrangement (2) according to any of the preceding claims, wherein the first pipe connection (17) comprises one or more rigid pipes extending between the first and second end blocks (11, 12). 10
7. The feeder arrangement (2) according to any of claims 2-6, wherein the feed beam (10) comprises a second beam (15) extending in a longitudinal direction (A1) of the first beam (14), wherein the first beam (14) is arranged in sliding contact with the second beam (15) between a compacted position and an extended position in which it extends away in the first direction (A1) with respect to the second beam (15), wherein a second pipe connection (21) is arranged alongside the first pipe connection (17) between the first and second end blocks (11, 12) of the first beam (14). 20 25
8. The feeder arrangement according to claim 7, wherein the connection device (7) is arranged at the second beam (15) and connected to the second pipe connection (21) to connect the hydraulic arrangement (1') on the drill rig (1) to the rock drilling machine (3), via at least the first conduit (30A). 30
9. The feeder arrangement (2) according to claim 8, wherein the connection device (7) is connected to the second pipe connection (21) via a pipe connector (22), comprising a first and second chamber (25A, 25B) and wherein a first and a second port (39A, 39B) are provided in the second pipe connection (21) on opposite sides of a partition (29), the first port (39A) connecting the first hydraulic fluid port (P_1) of the connection device (7) to the first conduit (30A) in the first end of the second pipe connection (21) via the first chamber (25A), and the second port (39B) connecting the second hydraulic fluid port (P_2) of the connection device (7) to the second conduit (30B) via the second end of the second pipe connection (21) via the second chamber (25B). 35 40 45
10. The feeder arrangement (2) according to any of claims 3-9, wherein a hydraulic pressure source (P) of the hydraulic arrangement (1') on the drill rig (1) is arranged to drive a consumer (53, 54, 55) of the rock drilling machine (3) via the first conduit line (30A) and wherein a return flow from the consumer (53, 54, 55) is connectable via the second conduit line (30B) to tank (T). 50 55

11. A drill rig (1) comprising one or more booms (5) and respective feeder arrangements (2), wherein the drill rig (1) comprises a hydraulic arrangement (1') including a hydraulic pressure source (P) for feeding the rock drilling machine (3) and a tank (T), and wherein each feeder arrangement (2) is arranged at an outer end of the respective boom (5), is hydraulically connected to the hydraulic arrangement (1') via the boom and comprises features according to any of claims 1-10.

Patentansprüche

1. Zuführanordnung (2) für eine Gesteinsbohrmaschine (3) auf einem Bohrgestell (1), wobei die Zuführanordnung umfasst:

- einen Zuführbalken (10) mit einem ersten Balken (14), der einen ersten Endblock (11) und einen zweiten Endblock (12) an seinen gegenüberliegenden Enden umfasst,
- eine erste Rohrverbindung (17), die sich zwischen dem ersten Endblock (11) und dem zweiten Endblock (12) erstreckt, und
- ein Gesteinsbohrmaschinenverbinder (19) einschließlich mindestens eines ersten Verbinderschlusses (P_A), der mit der Gesteinsbohrmaschine (3) verbindbar ist, wobei der Gesteinsbohrmaschinenverbinder (19) in Bezug auf die erste Rohrverbindung (17) verschiebbar angeordnet ist,

wobei die erste Rohrverbindung (17) in dem Zuführbalken (10) enthalten ist und über eine erste Leitung (30A), die durch ein erstes Ende der ersten Rohrverbindung (17) und den ersten Endblock (11) verläuft, mit einer hydraulischen Anordnung (1') auf dem Bohrgestell (1) fluidmäßig verbindbar ist, wobei die erste Rohrverbindung (17) einen ersten Fluidanschluss (38A) zu einer ersten Kammer (27A) des Gesteinsbohrmaschinenverbinders (19) umfasst; und wobei der erste Verbinderschluss (P_A) über die erste Leitung (30A) in Fluidverbindung mit der ersten Kammer (27A) steht, um die Gesteinsbohrmaschine (3) mit der hydraulischen Anordnung (1') auf dem Bohrgestell (1) zu verbinden und unter Druck stehendes Hydraulikfluid zum Antrieb mindestens eines Verbrauchers (53, 54, 55) der hydraulischen Gesteinsbohrmaschine (3) bereitzustellen.

2. Zuführanordnung (2) nach Anspruch 1, weiter umfassend eine Verbindungsvorrichtung (7), einschließlich mindestens eines ersten Hydraulikfluidanschlusses (P_1), der mit einer Hydraulikanordnung (1') auf dem Bohrgestell (1) verbindbar ist, und wobei die erste Kammer (27A) des Gesteinsbohrmaschinenverbinders über die erste Leitung (30A) in Fluid-

verbindung mit der Verbindungsvorrichtung (7) steht.

3. Zuführanordnung (2) nach Anspruch 2, wobei die Verbindungsvorrichtung (7) einen zweiten Hydraulikfluidanschluss (P_2) einschließt, der mit der Hydraulikanordnung (1') auf dem Bohrgestell (1) verbindbar ist, und der Gesteinsbohrmaschinenverbinder (19) einen zweiten Verbinderanschluss (P_B) einschließt, der mit der Gesteinsbohrmaschine (3) verbindbar ist, und wobei der zweite Hydraulikfluidanschluss (P_2) und der zweite Verbinderanschluss (P_B) über eine zweite Leitung (30B), die durch ein zweites Ende der ersten Rohrverbindung (17) und den zweiten Endblock (12) verläuft, verbunden sind, wobei die erste Rohrverbindung (17) einen zweiten Fluidanschluss (38B) umfasst, der mit einer zweiten Kammer (27B) des Gesteinsbohrmaschinenverbinders (19) verbunden ist, wobei die zweite Leitung (30B) eine Rückleitung von mindestens einem Verbraucher (53, 54, 55) der hydraulischen Gesteinsbohrmaschine (3) zu der hydraulischen Anordnung (1') auf dem Bohrgestell (1) bereitstellt.
4. Zuführanordnung (2) nach Anspruch 3, wobei die Rohrverbindung weiter eine Trennwand (37) umfasst, die die erste Kammer (27A) von der zweiten Kammer (27B) trennt.
5. Zuführanordnung (2) nach einem der vorstehenden Ansprüche, wobei die erste Rohrverbindung (17) mindestens zwei parallele Rohre (17A, 17B) umfasst, die sich zwischen dem ersten und dem zweiten Endblock (11, 12) erstrecken und getrennte Hydraulikleitungen über getrennte Gesteinsbohrmaschinenverbinder (19A, 19B) bereitstellen.
6. Zuführanordnung (2) nach einem der vorstehenden Ansprüche, wobei die erste Rohrverbindung (17) ein oder mehrere starre Rohre umfasst, die sich zwischen dem ersten und zweiten Endblock (11, 12) erstrecken.
7. Zuführanordnung (2) nach einem der Ansprüche 2-6, wobei der Zuführbalken (10) einen zweiten Balken (15) umfasst, der sich in einer Längsrichtung (A1) des ersten Balkens (14) erstreckt, wobei der erste Balken (14) in gleitendem Kontakt mit dem zweiten Balken (15) zwischen einer kompakten Position und einer ausgefahrenen Position angeordnet ist, in der er sich in der ersten Richtung (A1) in Bezug auf den zweiten Balken (15) entfernt, wobei eine zweite Rohrverbindung (21) neben der ersten Rohrverbindung (17) zwischen dem ersten und zweiten Endblock (11, 12) des ersten Balkens (14) angeordnet ist.
8. Zuführanordnung nach Anspruch 7, wobei die Ver-

bindungsvorrichtung (7) am zweiten Balken (15) angeordnet und mit der zweiten Rohrverbindung (21) verbunden ist, um die hydraulische Anordnung (1') auf dem Bohrgestell (1) über mindestens die erste Leitung (30A) mit der Gesteinsbohrmaschine (3) zu verbinden.

9. Zuführanordnung (2) nach Anspruch 8, wobei die Verbindungsvorrichtung (7) mit dem zweiten Rohranschluss (21) über einen Rohrverbinder (22) verbunden ist, der eine erste und eine zweite Kammer (25A, 25B) umfasst, und wobei ein erster und ein zweiter Anschluss (39A, 39B) in der zweiten Rohrverbindung (21) auf gegenüberliegenden Seiten einer Trennwand (29) bereitgestellt sind, wobei der erste Anschluss (39A) den ersten Hydraulikfluidanschluss (P_1) der Verbindungsvorrichtung (7) mit der ersten Leitung (30A) im ersten Ende der zweiten Rohrverbindung (21) über die erste Kammer (25A) verbindet, und der zweite Anschluss (39B) den zweiten Hydraulikfluidanschluss (P_2) der Verbindungsvorrichtung (7) mit der zweiten Leitung (30B) über das zweite Ende der zweiten Rohrverbindung (21) über die zweite Kammer (25B) verbindet.
10. Zuführanordnung (2) nach einem der Ansprüche 3-9, wobei eine hydraulische Druckquelle (P) der hydraulischen Anordnung (1') auf dem Bohrgestell (1) zum Antrieb eines Verbrauchers (53, 54, 55) der Gesteinsbohrmaschine (3) über die erste Leitung (30A) angeordnet ist und wobei ein Rücklauf vom Verbraucher (53, 54, 55) über die zweite Rohrleitung (30B) mit Tank (T) verbindbar ist.
11. Bohrgestell (1), umfassend einen oder mehrere Ausleger (5) und entsprechende Zuführanordnungen (2), wobei das Bohrgestell (1) eine hydraulische Anordnung (1') umfasst einschließlich einer hydraulischen Druckquelle (P) zur Versorgung der Gesteinsbohrmaschine (3) und eines Tanks (T), und wobei jede Zuführanordnung (2) an einem äußeren Ende des jeweiligen Auslegers (5) angeordnet ist, über den Ausleger hydraulisch mit der Hydraulikeinrichtung (1') verbunden ist und Merkmale nach einem der Ansprüche 1-10 aufweist.

Revendications

1. Arrangement alimenteur (2) pour une machine (3) de forage de roche sur un appareil (1) de forage, lequel arrangement alimenteur comprend :
 - une poutre (10) d'alimentation avec une première poutre (14) qui comprend un premier bloc (11) d'extrémité et un second bloc (12) d'extrémité à des extrémités opposées de celle-ci,
 - un premier raccord (17) de tuyau s'étendant

entre le premier bloc (11) d'extrémité et le second bloc (12) d'extrémité, et

- un connecteur (19) de machine de forage de roche incluant au moins un premier orifice (P_A) de connecteur qui peut être connecté à la machine (3) de forage de roche, le connecteur (19) de machine de forage de roche étant disposé de manière coulissante par rapport au premier raccord (17) de tuyau,

dans lequel le premier raccord (17) de tuyau est compris dans la poutre (10) d'alimentation et peut être connecté de manière fluide à un arrangement hydraulique (1') sur l'appareil (1) de forage via un premier conduit (30A) passant par une première extrémité du premier raccord (17) de tuyau et le premier bloc (11) d'extrémité, le premier raccord (17) de tuyau comprenant un premier orifice de fluide (38A) vers une première chambre (27A) du connecteur (19) de machine de forage de roche ; et dans lequel le premier orifice (P_A) de connecteur est en connexion fluide avec la première chambre (27A) via le premier conduit (30A) pour connecter la machine (3) de forage de roche à l'arrangement hydraulique (1') sur l'appareil (1) de forage et pour fournir un fluide hydraulique sous pression pour entraîner au moins un consommateur (53, 54, 55) de la machine hydraulique (3) de forage.

2. Arrangement alimenteur (2) selon la revendication 1, comprenant en outre un dispositif (7) de connexion incluant au moins un premier orifice (P_1) de fluide hydraulique qui peut être connecté à un arrangement hydraulique (1') sur l'appareil (1) de forage, et dans lequel la première chambre (27A) du connecteur de machine de forage de roche est en connexion fluide avec le dispositif (7) de connexion via le premier conduit (30A).

3. Arrangement alimenteur (2) selon la revendication 2, dans lequel le dispositif (7) de connexion comprend un second orifice (P_2) de fluide hydraulique qui peut être connecté à l'arrangement hydraulique (1') sur l'appareil (1) de forage et le connecteur (19) de machine de forage de roche inclut un second orifice (P_B) de connecteur qui peut être connecté à la machine (3) de forage de roche, et dans lequel le second orifice (P_2) de fluide hydraulique et le second orifice (P_B) de connecteur sont connectés via un second conduit (30B) passant par une seconde extrémité du premier raccord (17) de tuyau et le second bloc (12) d'extrémité, le premier raccord (17) de tuyau comprenant un second orifice (38B) de fluide qui est connecté à une seconde chambre (27B) du connecteur (19) de machine de forage de roche, le second conduit (30B) fournissant une conduite de retour allant d'au moins un consommateur (53, 54, 55) de la machine hydraulique (3) de forage de roche

à l'arrangement hydraulique (1') sur l'appareil (1) de forage.

4. Arrangement alimenteur (2) selon la revendication 3, dans lequel le raccord de tuyau comprend en outre une cloison (37) qui sépare la première chambre (27A) de la seconde chambre (27B).

5. Arrangement alimenteur (2) selon l'une quelconque des revendications précédentes, dans lequel le premier raccord (17) de tuyau comprend au moins deux tuyaux parallèles (17A, 17B) s'étendant entre les premier et second blocs (11, 12) d'extrémité et fournissant des conduits hydrauliques séparés via des connecteurs (19A, 19B) de machine de forage de roche séparés.

6. Arrangement alimenteur (2) selon l'une quelconque des revendications précédentes, dans lequel le premier raccord (17) de tuyau comprend un ou plusieurs tuyaux rigides entre les premier et second blocs (11, 12) d'extrémité.

7. Arrangement alimenteur (2) selon l'une quelconque des revendications 2 à 6, dans lequel la poutre (10) d'alimentation comprend une seconde poutre (15) s'étendant dans une direction longitudinale (A_1) de la première poutre (14), dans lequel la première poutre (14) est disposée en contact coulissant avec la seconde poutre (15) entre une position compactée et une position étendue dans laquelle elle s'étend à l'opposé dans la première direction (A_1) par rapport à la seconde poutre (15), dans lequel un second raccord (21) de tuyau est disposé le long du premier raccord (17) de tuyau entre les premier et second blocs (11, 12) d'extrémité de la première poutre (14).

8. Arrangement alimenteur selon la revendication 7, dans lequel le dispositif (7) de connexion est disposé au niveau de la seconde poutre (15) et connecté au second raccord (21) de tuyau pour connecter l'arrangement hydraulique (1') sur l'appareil (1) de forage à la machine (3) de forage de roche, via au moins le premier conduit (30A).

9. Arrangement alimenteur (2) selon la revendication 8, dans lequel le dispositif (7) de connexion est connecté au second raccord (21) de tuyau via un connecteur (22) de tuyau, comprenant une première et une seconde chambre (25A, 25B) et dans lequel un premier et un second orifice (39A, 39B) sont disposés dans le second raccord (21) de tuyau sur des côtés opposés d'une cloison (29), le premier orifice (39A) connectant le premier orifice (P_1) de fluide hydraulique du dispositif (7) de connexion au premier conduit (30A) dans la première extrémité du second raccord (21) de tuyau via la première chambre (25A), et le second orifice (39B) connectant le second ori-

fice (P_2) de fluide hydraulique du dispositif (7) de connexion au second conduit (30B) via la seconde extrémité du second raccord (21) de tuyau via la seconde chambre (25B).

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10. Arrangement alimenteur (2) selon l'une quelconque des revendications 3 à 9, dans lequel une source (P) de pression hydraulique de l'arrangement hydraulique (1') sur l'appareil (1) de forage est agencée pour entraîner un consommateur (53, 54, 55) de la machine (3) de forage de roche via la première conduite (30A) de conduit et dans lequel un flux de retour provenant du consommateur (53, 54, 55) peut être connecté via la seconde conduite (30B) de conduit à un réservoir (T).
11. Appareil (1) de forage comprenant une ou plusieurs flèches (5) et des arrangements (2) alimenteurs respectifs, dans lequel l'appareil (1) de forage comprend un arrangement hydraulique (1') incluant une source (P) de pression hydraulique pour alimenter la machine (3) de forage de roche et un réservoir (T), et dans lequel chaque arrangement alimenteur (2) est disposé à une extrémité extérieure de la flèche respective (5), est connecté de manière hydraulique à l'arrangement hydraulique (1') via la flèche et comprend des caractéristiques selon l'une quelconque des revendications 1 à 10.

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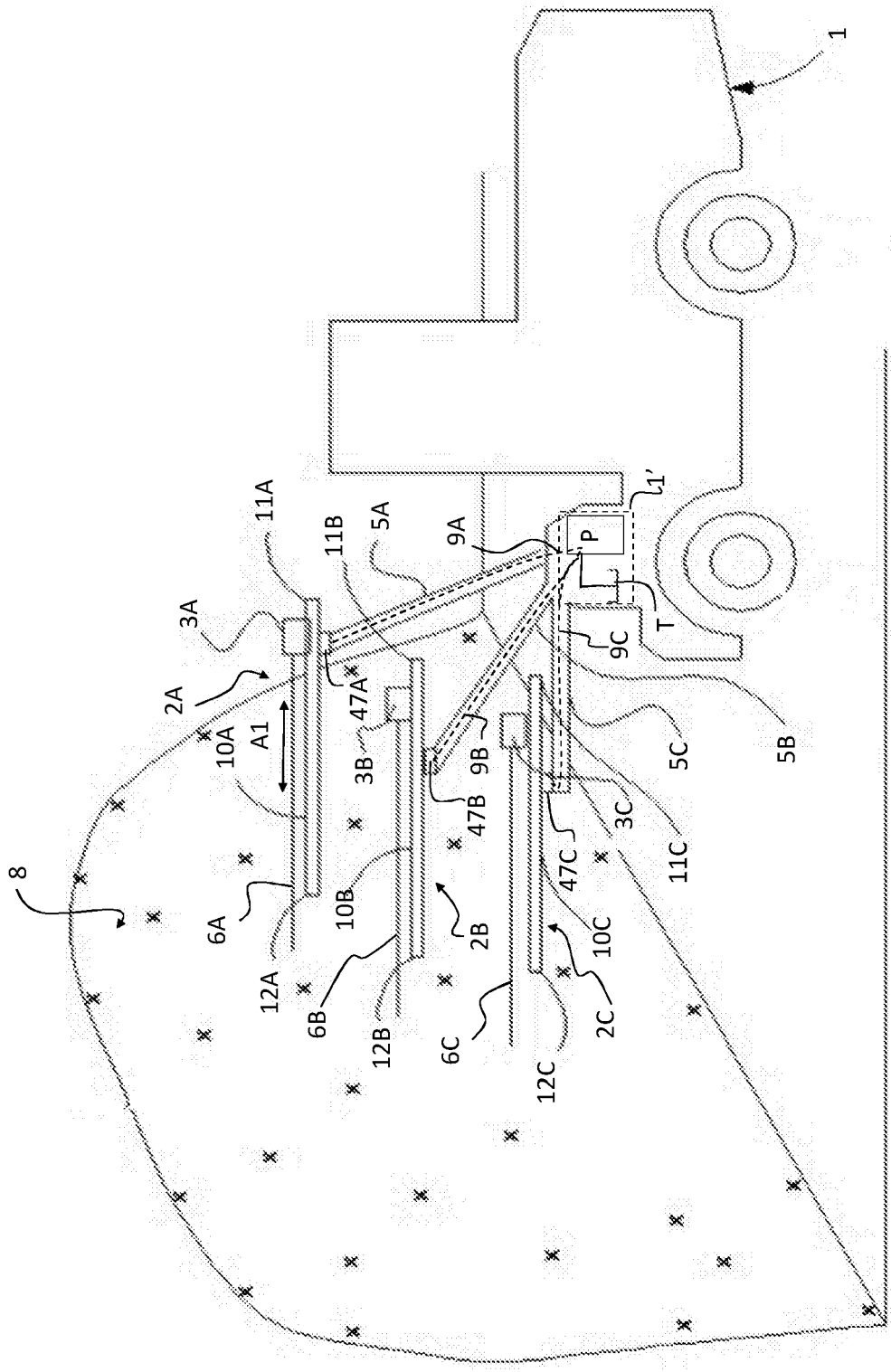
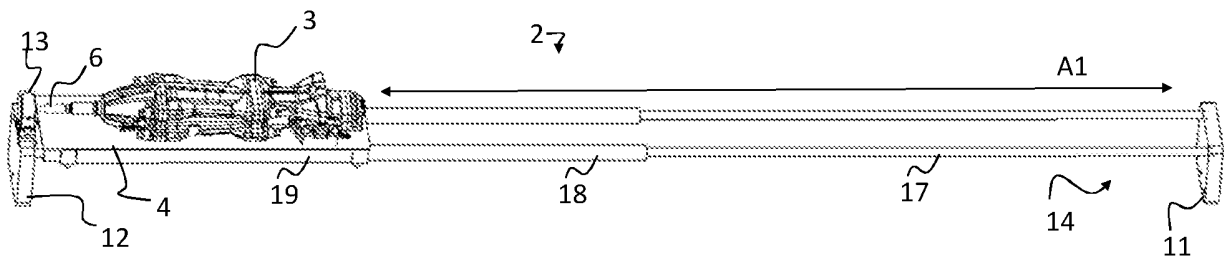
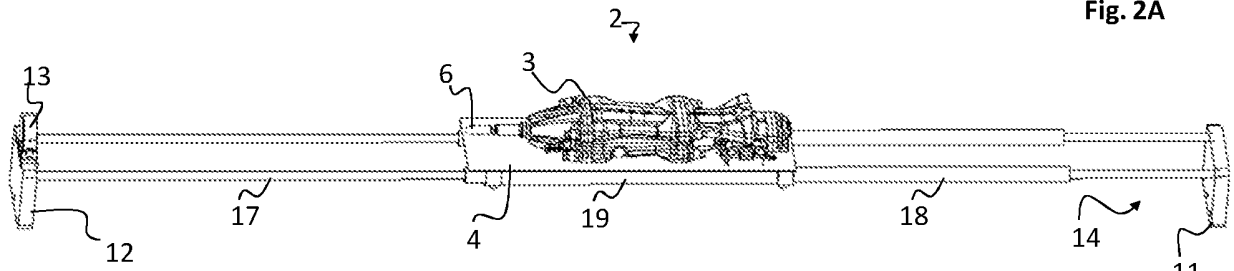
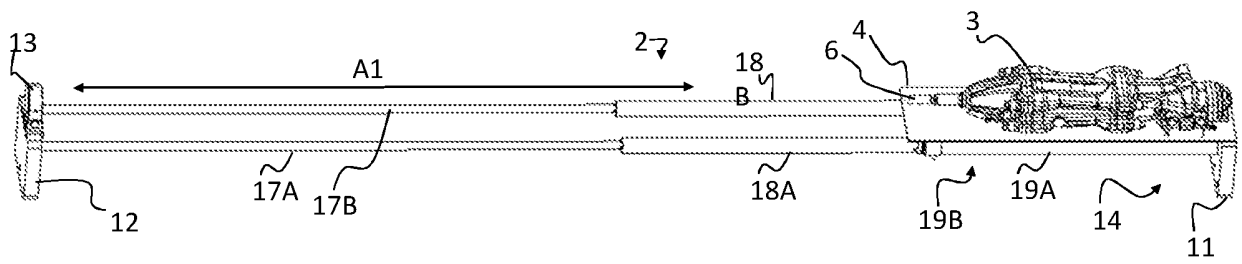
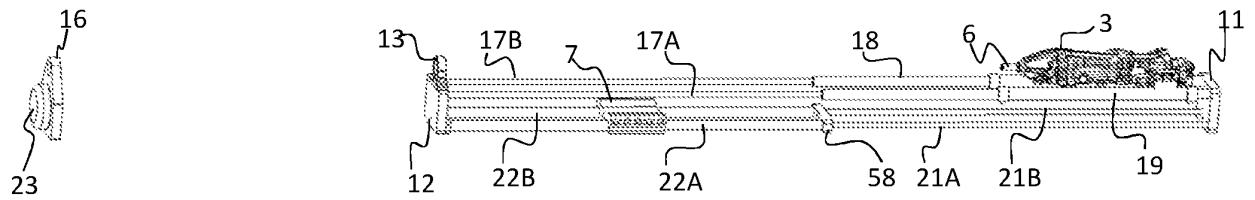
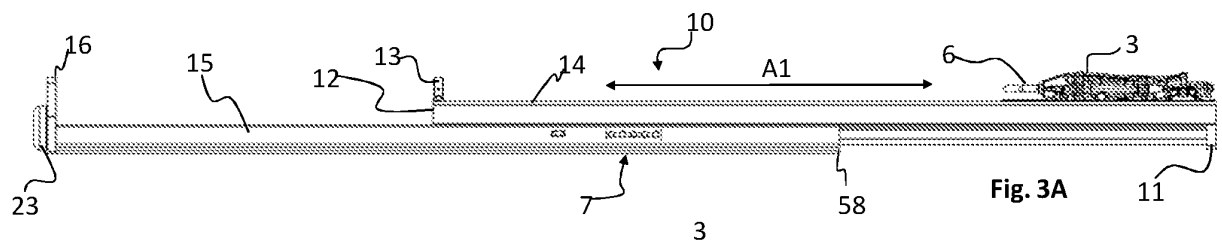


Fig. 1





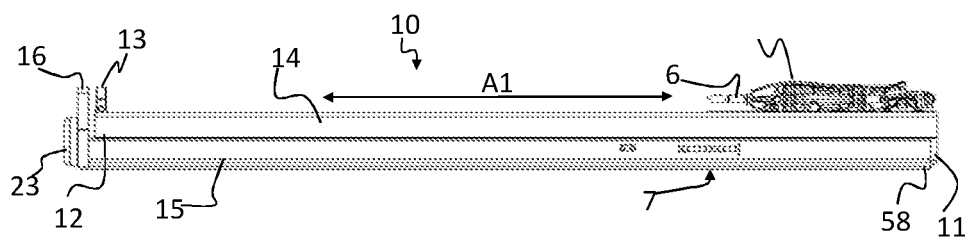


Fig. 4A

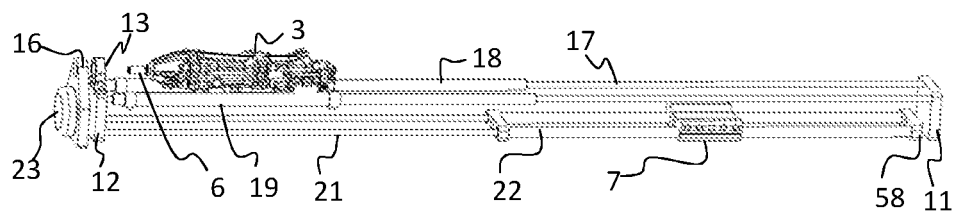


Fig. 4B

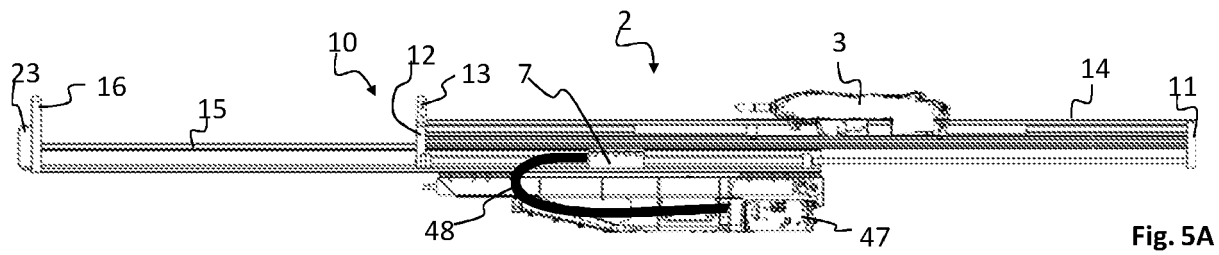


Fig. 5A

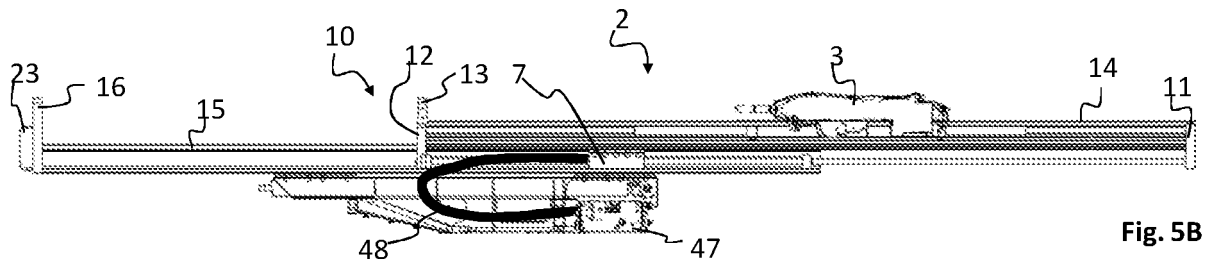


Fig. 5B

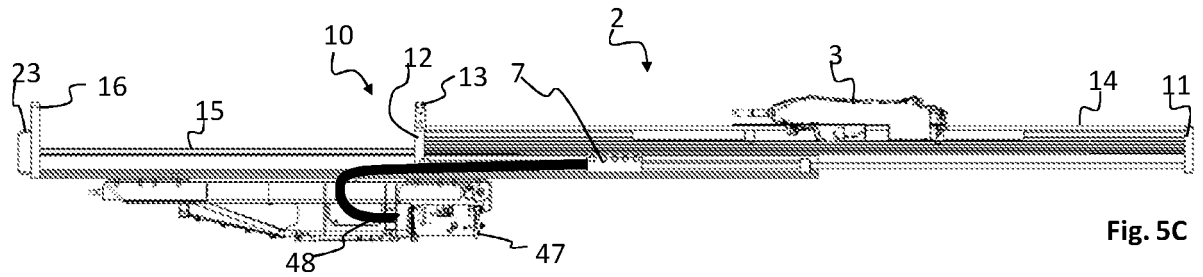


Fig. 5C

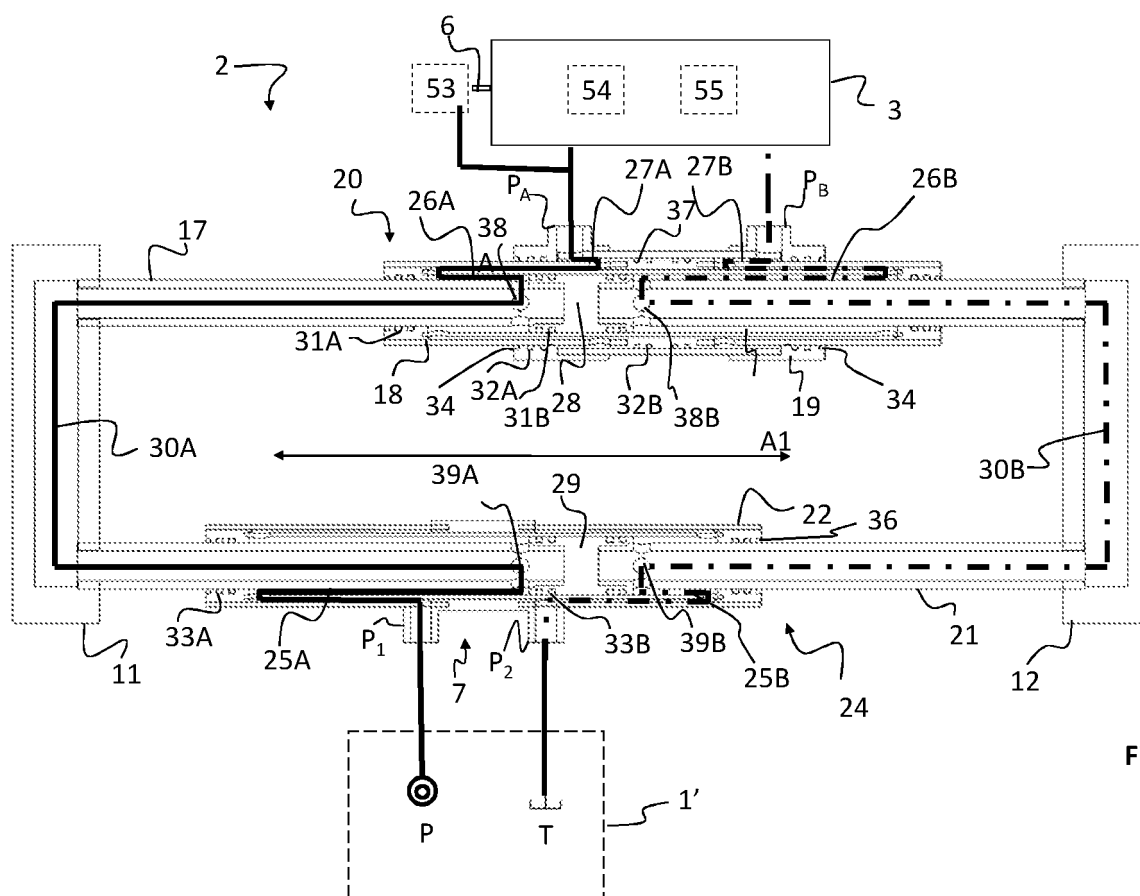


Fig. 6

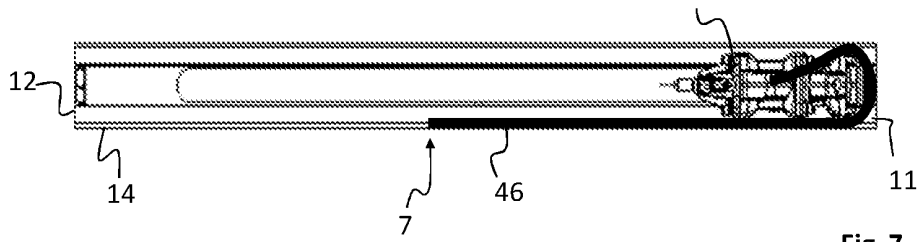


Fig. 7

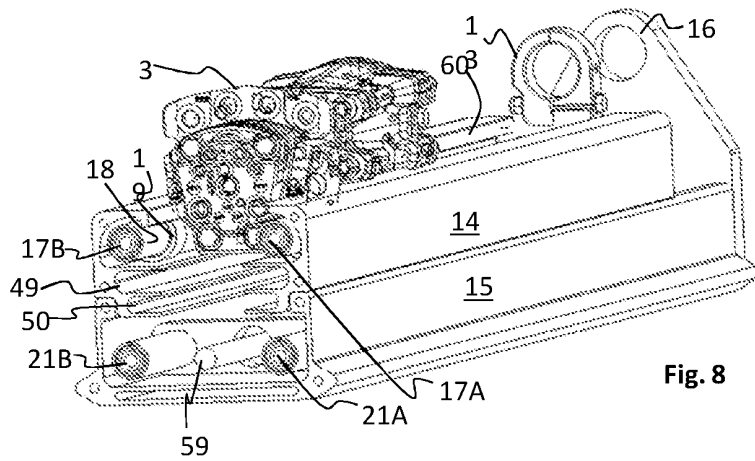


Fig. 8

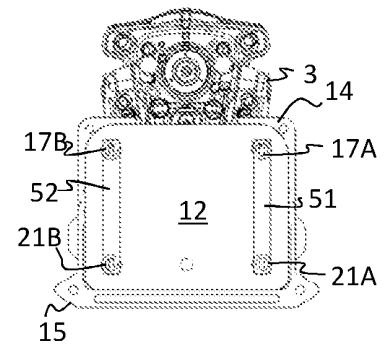


Fig. 9

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 4039032 A [0006]