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(71) Applicant: **Atlas Copco Construction and Mining Technique AB**
Nacka
S-105 23 Stockholm (SE)

(72) Inventor: **Eriksson, Sven**
Vassvägen 3
S-702 31 Örebro (SE)

(74) Representative: **Grundfelt, Erik Gunnar**
Atlas Copco Tunneling & Mining AB Patents & Trademarks
S-105 23 Stockholm (SE)

(54) Rock drilling rig.

(57) A rock drilling rig comprising a first boom member (12) connected to a carrier (11) by a universal joint (13) and a second boom member (14) being longitudinally displaceable relative to the first boom member by a hydraulic cylinder (18) inside the second boom member. The external surface of the hydraulic cylinder is provided with lands (25) and intervening grooves (26) into which ridges (27) on second boom member (14) extend. A rotary motor (17) at the rear end of first boom member (12) rotates the second boom member by rotating the hydraulic cylinder.

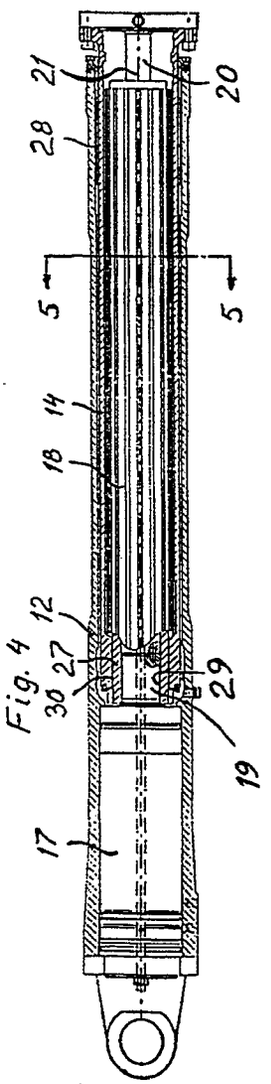

Fig. 4

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ROCK DRILLING RIG

The present invention relates to a rock drilling rig and in particular to a rig having an extension boom.

In prior art drill rigs it has been common practice to guide the extensionpart of the boom such that relative rotation between the two boom parts cannot occur. In applications with rotation of the boom head about the longitudinal axis of the boom one has used a rotary motor at the distal end of the boom. A drawback with such an arrangement is that the weight at the distal end of the boom becomes rather high. As a consequence the boom and the drill rig must be made stronger and heavier than otherwise. Furthermore, the front end becomes quite big if one wants to have further possibilities of manoeuvering the feed beam of the rig relative to the surrounding rock.

The present invention, which is defined in the subsequent claims, aims at providing a rock drilling rig with an extension boom where the extension part of the boom is rotatable about the longitudinal axis of the boom by means of a motor positioned at the proximal end of the boom. This gives the advantage of having the weight of the rotary motor near the carrier so that the boom does not have to be heavy in order to be sufficiently stiff. Another advantage is that the rotary motor does not interfere with other manoeuvering means for the feed beam which sometimes are desirable. An important advantage with the invention is that the extension and rotation movement of the boom can be guided in a common bearing arrangement which allows savings of weight and cost. All sensitive bearings for extention and rotation can with this invention be easily sealed off with a simple and reliable circular sealing which will significantly increase service life and decrease maintenance costs of the boom

An embodiment of the invention is described below with reference to the accompanying drawings in which fig 1 shows a side view of a drill rig according to the invention. Fig 2 shows a part of the drill rig and indicates possibilities of movement of the feed beam. Fig 3 shows how a rock drilling machine can be moved close to the rock surface. Fig 4 shows a longitudinal section through the boom of the drill rig. Fig 5 is a section according to 5-5 in fig 4.

The rock drilling rig shown in the drawings comprises a carrier 11 on which a first elongated boom member 12 is mounted by means of a universal joint 13. The first boom member is swingable relative to carrier 11 by means of two hydraulic cylinders 32, only one visible in the drawing. A second elongated boom member 14 is guided by the first boom member for longitudinal movement therein. A sliding bearing 28 is placed between the first and second boom members. At the rear or proximal end of first boom member 12 a rotary motor 17 is mounted. The outgoing shaft 19 of the rotary motor is by means of a splined coupling 29 connected with a hydraulic cylinder 18 which can be rotated by means of the rotary motor 17. The external surface of the hydraulic cylinder is provided with a number of longitudinal lands 25 and intervening grooves 26. The second boom member 14 is at its rear end of its internal surface provided with ridges 27 which extend into the grooves 26 of the hydraulic cylinder 18. In this way turning of hydraulic cylinder 18 is transferred to second boom member 14 independent of the position of the second boom member along the hydraulic cylinder. A plastic sheet 30 is positioned over ridges 27 to form a bearing between hydraulic cylinder 18 and second boom member 14. A piston 31 with a piston rod 20, having a longitudinal axis 21, are movable along the hydraulic cylinder 18 by means of hydraulic fluid entered into the hydraulic cylinder on either side of the piston 31. Piston rod 20 is connected with second boom member 14 so that movement of piston 31 causes relative longitudinal movement between the first and second boom members 12,14.

At the front or distal end of second boom member 14 a boom head 24 comprising a turning motor 22 is mounted. This turning motor makes it possible to turn the boom head about its axis 23 in addition to the movements made possible by the second boom member. A holder 33 for the feed beam 15 is pivotable about a pivot 34 by means of a hydraulic cylinder 35. Feed beam 15 is displaceable in holder 33 by hydraulic cylinder 36. A rock drilling machine 16 is movable along feed beam 15 in a conventional way.

Claims

1. A rock drilling rig comprising a carrier (11), a first elongated boom member (12), a universal joint (13) connecting said first boom member to said carrier, a second elongated boom member (14) guided by said first boom member for longitudinal movement relative thereto, a feed beam (15) pivotally connected to said second boom member and a rock drilling machine (16) moveable along said feed beam, **characterized** by a rotary motor (17) in said first boom member (12), a hydraulic cylinder (18) connected to an outgoing shaft (19) of said rotary motor, a piston rod (20) of said hydraulic cylinder being connected to said second boom member (14) to cause relative longitudinal movement between said first and second boom members, said second boom member being coupled to said hydraulic cylinder such that the second boom member is turnable about its longitudinal axis (21) by said hydraulic cylinder.

2. A rock drilling rig according to claim 1, **charac-**

terized in that said feed beam (15) is pivotally connected to a boom head (24) being mounted on said second boom member (14) and having an axis (23) being perpendicular to the longitudinal axis (21) of said second boom member (14).

3. A rock drilling rig according to claim 2, **characterized** in that said boom head (24) comprises a turning motor (22) by means of which the boom head is turnable about its axis (23).

4. A rock drilling rig according to any one of the preceding claims, **characterized** in that the external surface of said hydraulic cylinder (18) is provided with a number of longitudinal lands (25) and intervening grooves (26) and that the internal surface of said second boom member (14) is provided with ridges (27) for cooperation with said grooves

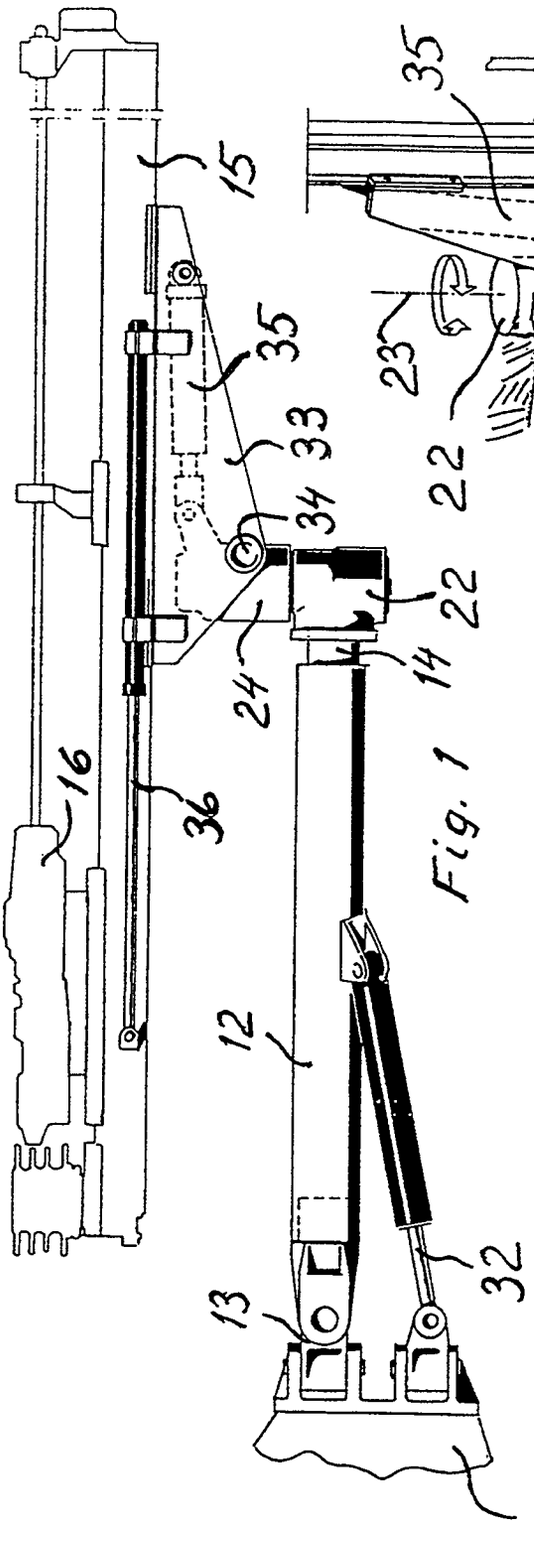

Fig. 1

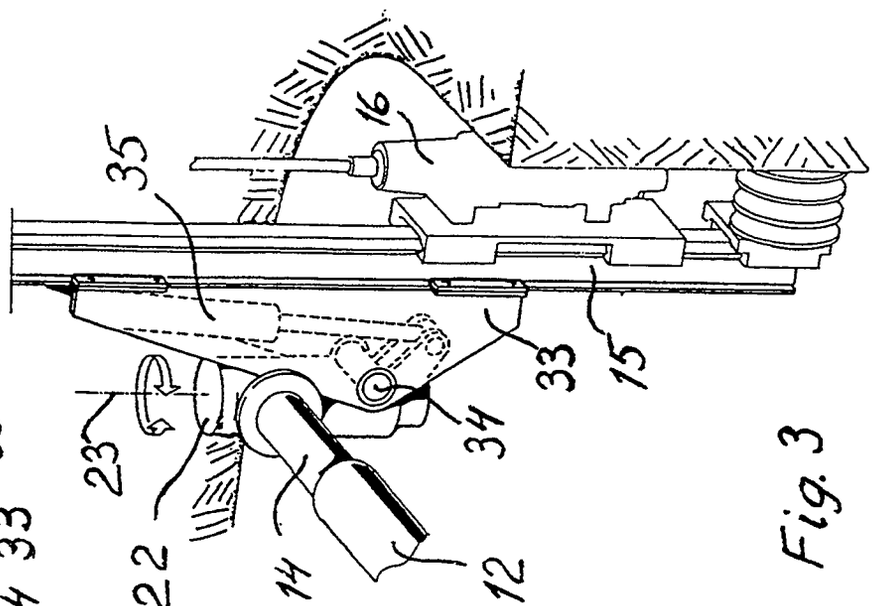

Fig. 3

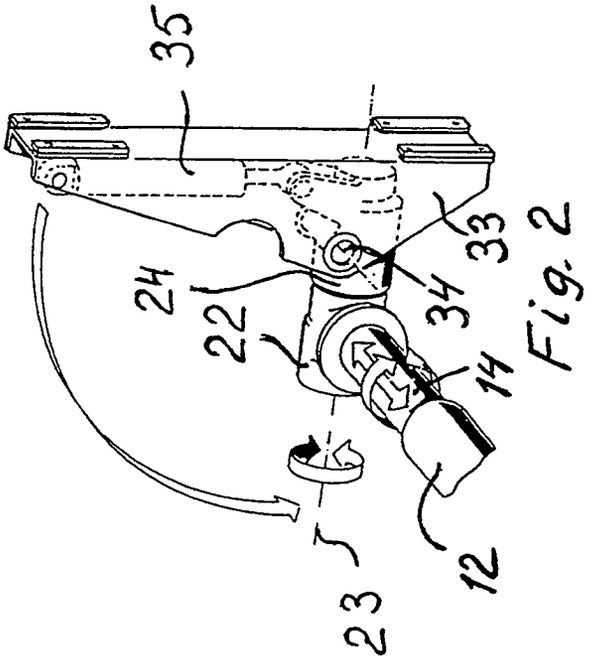

Fig. 2

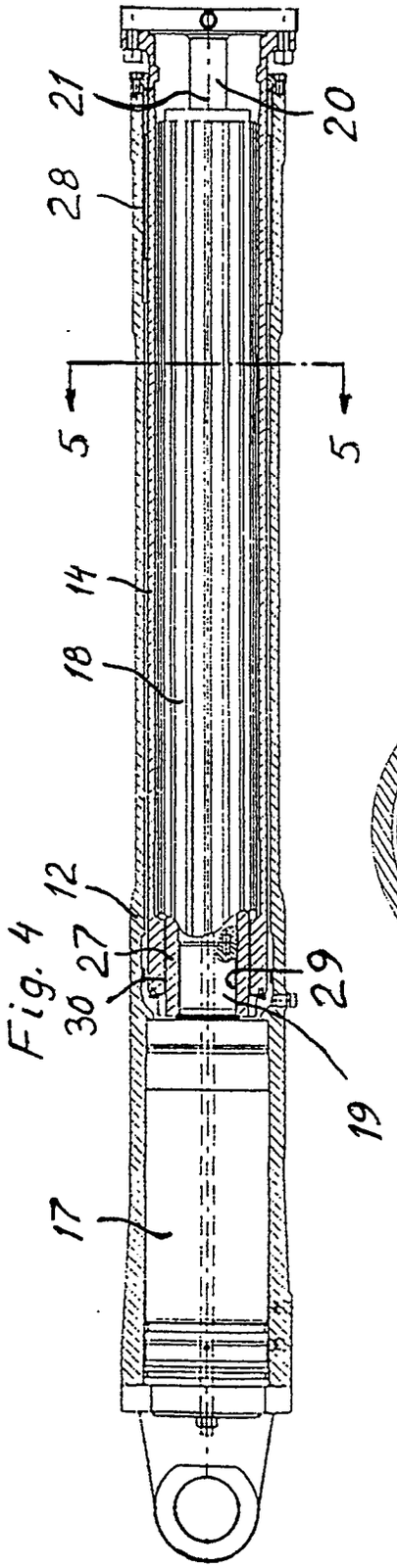

Fig. 4

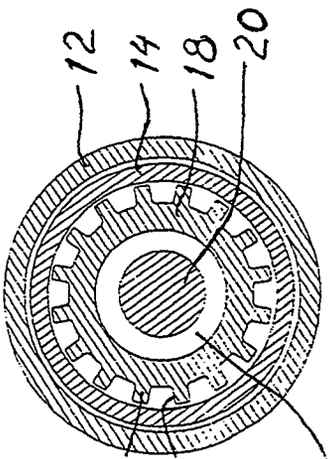

Fig. 5

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EUROPEAN SEARCH REPORT

Application Number

EP 90 85 0386

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	US-A-3226064 (THOMPSON) * the whole document *	1	E21B7/02
A	GB-A-2119441 (DOWTY HYDRAULIC UNITS LTD) * abstract; figure 1 * * page 2, lines 9 - 34 *	1	
A	BE-A-527878 (SOCIETE TECHNIQUE POUR L'INDUSTRIE MINIERE) * page 3, line 35 - page 4, line 31; figure 1 *	1	
A	EP-A-16717 (MONTABERT) * abstract; figure 2 *	1	
A	AU-A-528751 (COOPER IND.) * abstract; claim 1; figure 4 *	1	
A	GB-A-2103969 (FURUHOLMEN) * abstract; figure 1 *	1	
A	US-A-3020012 (MORACCO) * column 2, line 52 - column 3, line 6; figures 1, 2 *	1	TECHNICAL FIELDS SEARCHED (Int. Cl.5) E21B E21C E02F F15B
A	DE-A-1805226 (GEBR. BÖHRER) * page 5, lines 20 - 29; figure 1 *	1	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	26 MARCH 1991	WEIAND T.

CATEGORY OF CITED DOCUMENTS

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