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**Datasheet for the decision
of 7 March 2023**

Case Number: T 0750/20 - 3.2.01

Application Number: 06716907.8

Publication Number: 1856367

IPC: E21B7/02

Language of the proceedings: EN

Title of invention:

ROTATION DEVICE FOR A BOOM OF A MINING OR CONSTRUCTIONS WORK
RIG, RIG AND BOOM

Patent Proprietor:

Epiroc Rock Drills Aktiebolag

Opponents:

Sandvik Mining and Construction Oy
Andersen Mek. Verksted AS

Headword:

Relevant legal provisions:

EPC Art. 54, 56, 84
RPBA 2020 Art. 12(6)

Keyword:

Novelty - main request (no)

Inventive step - obvious alternative - common general knowledge
- auxiliary request (no)

Claims - clarity - auxiliary request (no)

Late-filed request - should have been submitted in first-
instance proceedings (yes)

Decisions cited:

Catchword:



Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: T 0750/20 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 7 March 2023

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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
28 January 2020 concerning maintenance of the
European Patent No. 1856367 in amended form.**

Composition of the Board:

Chairman G. Pricolo
Members: M. Geisenhofer
 S. Fernández de Córdoba

Summary of Facts and Submissions

- I. Appeals were filed by the patent proprietor and both opponent 1 and opponent 2 against the interlocutory decision of the opposition division finding that, on the basis of the auxiliary request 3 (then on file), the patent in suit met the requirements of the EPC.
- II. In particular, the opposition division decided that the claims of the auxiliary request 3 were sufficiently clear.

With regard to higher ranked requests, the opposition division held *inter alia* that the subject-matter of the main request (patent as granted) was not novel over document

D3 US 4 799 556,

whereas the subject-matter of the independent claim of the auxiliary request 1 extended beyond the content of the application as filed. The subject-matter of the independent claim of the auxiliary request 2 was not inventive over a combination of D3 with the common general knowledge of the skilled person.

- III. With letter dated 28 October 2020, opponent 2 withdrew their appeal.
- IV. Oral proceedings were held before the Board.
- (a) The appellant (patent proprietor) requested that the decision under appeal be set aside and the patent be maintained as granted (main request), auxiliarily that the patent be maintained in amended form based on one of the auxiliary requests

1A, 2A, 3A and 4D filed with letter dated 21 December 2022. All other auxiliary requests were withdrawn.

(b) The appellant (opponent 1) requested that the decision under appeal be set aside and the patent be revoked.

(c) The party as of right (opponent 2) requested in writing that the decision under appeal be set aside and the patent be revoked.

V. The independent claim of the **main request** reads as follows:

"Mining or constructions work rig including an elongate boom (9,11) and a rotation device (12) for rotation of equipment (13) fastened at the region of a distal end of the boom (9,11), which has a general longitudinal axis, wherein the rotation device (12) includes a first rotation unit (R1) comprising a first rotation motor (17) arranged at said distal end of the boom (9,11) to rotate the equipment around a first axis (A1) that is essentially parallel to the longitudinal axis of the boom (9,11) and a second rotation unit (R2) comprising a second rotation motor (18) which is arranged to rotate the equipment around a second axis (A2), characterized in that the rotation units (R1, R2) are fastened to an angle unit (12'), which is included in the rotation device (12), wherein the angle unit (12') has a body with two mutually angled attachments (23, 25) for the rotation motors (17,18), so that the rotation motors (17,18) are positioned in an intermediate portion (24) of the angle unit (12'), wherein the first and second

rotational axes (A1, A2) of the rotation units (R1, R2) extend at an angle with respect to each other."

The independent claim of the **auxiliary request 1A** additionally requires the following features:

"and wherein each rotation motor (17,18) is arranged to transmit rotational movement over a toothed gear unit (19,20), wherein said toothed gear unit (19,20) is a planet gear transmission unit."

The independent claim of the **auxiliary request 2A** differs from the auxiliary request 1A in that the following additional feature is required:

"and wherein the toothed gear units (19,20) are positioned outside of the intermediate portion (24), between the angle unit (12') and the boom (9,11), and between the angle unit (12') and the equipment (13), respectively."

The independent claim of the **auxiliary request 3A** is also based on auxiliary request 1A but requires the following additional feature:

"and wherein the planet gear transmission units (19,20), each with a desired number of steps, are connected to an outgoing axis in the form of a rotation ring (21,22), respectively, which are fastenable to the boom (9,11) and to a fastening bracket (26) of the equipment (13), respectively."

The independent claim of the **auxiliary request 4D** reads as follows:

"Mining or constructions work rig including an elongate boom (9,11) that includes a first boom portion (9)

which is arranged to be pivotally connected to said rig via a carrier (2), and a second boom portion (11) which is arranged telescopically displaceable with respect to the first boom portion (9) along the longitudinal axis of the boom, and a rotation device (12) for rotation of equipment (13) fastened at the region of a distal end of the boom (9,11), which has a general longitudinal axis, wherein the rotation device (12) includes a first rotation unit (R1) comprising a first rotation motor (17) arranged at said distal end of the boom (9,11) to rotate the equipment around a first axis (A1) that is essentially parallel to the longitudinal axis of the boom (9,11) and a second rotation unit (R2) comprising a second rotation motor (18) which is arranged to rotate the equipment around a second axis (A2),
c h a r a c t e r i z e d i n
that the rotation units (R1, R2) are fastened to an angle unit (12'), which is included in the rotation device (12), wherein the angle unit (12') has a body with two mutually angled attachments (23, 25) for the rotation motors (17,18), so that the rotation motors (17,18) are positioned in an intermediate portion (24) of the angle unit (12'), wherein the first and second rotational axes (A1, A2) of the rotation units (R1, R2) extend at an angle with respect to each other, wherein the intermediate portion (24) of the angle unit (12') is open or openable with the possibility of access from the outside to a rotation motor (17,18) belonging to the respective rotation unit (R1, R2), wherein the intermediate portion (24) is limited by the two mutually angled rotation motor attachments (23, 25) whereto the rotation motors (17,18) are fastened, and wherein each rotation motor (17,18) is arranged to transmit rotational movement over a toothed gear unit (19,20), wherein said toothed gear unit (19,20) is a planet gear transmission unit, and wherein the planet

gear transmission units (19,20), each with a desired number of steps, are connected to an outgoing axis in the form of a rotation ring (21,22), respectively, which are fastenable to the boom (9,11) and to a fastening bracket (26) of the equipment (13), respectively."

VI. The appellant-patent proprietor's arguments can be summarised as follows:

(a) The subject-matter of the independent claim of the **main request** was novel over document D3 for the following reasons:

- (i) D3 did not mention an angle unit;
- (ii) the hydraulic drives 44 and 46 shown in figure 2 were not rotation motors;
- (iii) the drives 44 and 46 were not attached to the angle unit; and
- (iv) the drives 44 and 46 were not positioned in an intermediate portion of the angle unit.

(b) The subject-matter of the independent claim of the **auxiliary request 1A** was inventive when starting from D3 as closest prior art for the following reasons:

- (i) The skilled person had no reason to replace the piston drive of D3. This would require an entire rebuild of the rotation device.
- (ii) The drive shown in figure 2 provided limited rotation of the equipment. This advantage would be lost when a planetary gear transmission with a motor having a rotating drive shaft would be used.

- (c) **Auxiliary request 2A** and **auxiliary request 3A** should be admitted into the proceedings since they further restricted the claimed device with respect to the design of the angle unit. The added features were uncomplicated to understand and clearly novel and inventive.
- (d) The wording of independent claim of the **auxiliary request 4D** was sufficiently clear for the skilled person.

VII. The appellant-opponent's arguments can be summarised as follows:

- (a) Document D3 anticipated the subject-matter of the independent claim of the **main request** for the following reasons:
 - (i) D3 disclosed an angle unit between the mounting 26 of the feed beam 28 and the arm 12 of the work rig;
 - (ii) the drive shown in figure 2 was a rotation motor since it provided relative rotation between plate 52 and ring 50;
 - (iii) the drives 44 and 46 needed to be attached to the angle unit since otherwise no relative rotation of the mounting 26 could be achieved with respect to the work rig; and
 - (iv) the drives extended from the extremity of the angle unit towards its centre and were hence positioned in an intermediate part of the angle unit.
- (b) The subject-matter of the independent claim of the **auxiliary request 1** was not inventive over a

combination of D3 with the common general knowledge of the skilled person for the following reasons:

- (i) D3 itself suggested in column 1, lines 53 and 54 to replace the rifle bar rotation unit by a gear box, a gear box implicitly requiring a motor with a rotating drive shaft;
 - (ii) a planetary gear box was the obvious choice for such a gear box since it was a compact solution with co-axial input and output shafts;
 - (iii) the fact that a planetary gear box had the characteristic of being compact was part of the general knowledge of the skilled person proven by excerpt D18 from the text book "Dynamics of Planetary Gear Trains" (R. August, R. Kasuba, H. L. Frater, and A. Pintz) and excerpt D19 from the text book "Machine Design - An Integrated Approach" (R. Norton).
- (c) **Auxiliary request 2A** and **auxiliary request 3A** should not be admitted into the proceedings. They should have been filed in opposition proceedings such that the opposition division could have decided on these requests.
- (d) The term "*desired number of steps*" used in the independent claim of the **auxiliary request 4D** was unclear.

Reasons for the Decision

Main request

1. The main request is identical to the patent as granted and hence corresponds to the main request in opposition proceedings on which the decision under appeal is based.

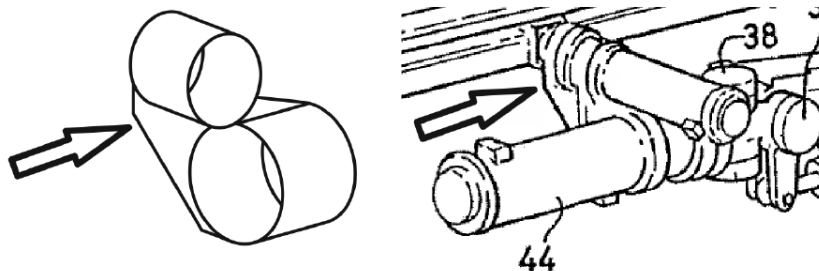
The opposition division held that the subject-matter of the independent claim of the main request is not novel over D3.

Novelty (Article 54 EPC)

2. The subject-matter of the independent claim of the main request is not novel over document D3.
 - 2.1 It is undisputed between the parties that D3 discloses a work rig with the features cited in the preamble of the independent claim of the main request, including a rotation device for rotating equipment in the form of a feed beam.
 - 2.2 The bracket shown in figure 1 of D3 between the mounting 26 of the feed beam 28 and the arm 12 is not *expressis verbis* described in D3, as the appellant-patent proprietor correctly noted.

However, the bracket is clearly visible in figure 1 and its function for rotating the feed beam relative to the arm 12 using rotation units 44 and 46 is described in column 2, lines 60 - 69 and shown in figure 2.

The bracket hence must have the geometry derived by the appellant-opponent in their grounds of appeal (cf. section 4.1.4, figure 5):



This bracket forms an angle unit in the sense of the patent in suit.

2.3 The angle unit has a body with two mutually angled attachments for drives 44 and 46 providing two rotational axes of the rotation units extending at an angle with respect to each other (cf. figure 3 of D3: first rotational axis 92 and second rotational axis perpendicular to the drawing plane, shown as circular arrow). Attachments of the angle units for the drives 44 and 46 are necessarily required since otherwise no relative rotation around the two axis would be possible.

2.4 Since the drives 44 and 46 of D3 provide for rotation between the arm 12 and the angle unit, and between the angle unit and the mounting 26 of the feed beam 28, respectively, the drives can be considered as "*rotation motors*". Contrary to the understanding of the appellant-patent proprietor, the term "*rotation*" does not require a rotating drive shaft of the drive but can also be considered to define the function of the drive (in the sense of "*providing a rotational movement*").

2.5 The drives 44 and 46 both extend from their attachment to the angle unit towards a centre of the angle unit such that the drives are positioned in an intermediate portion of the angle unit. Contrary to the appellant-patent proprietor's understanding, the intermediate portion of the angle unit is not limited by the contour of the angle unit but the intermediate portion is the portion between the two extremities of the angle unit where it connects to neighbouring parts of the work rig.

2.6 The Board therefore shares the decision of the opposition division that the subject-matter of claim 1 is known from D3.

Auxiliary request 1A

Admissibility (Article 12 RPBA 2020)

3. Auxiliary request 1A essentially corresponds to auxiliary request 1 filed during oral proceedings before the opposition division on which the decision under appeal was based.

Admissibility of this request was not challenged by the appellant-opponent.

Inventive step (Article 56 EPC)

4. The subject-matter of the independent claim of the auxiliary request 1A is not inventive over a combination of document D3 with the common general knowledge of the skilled person.

4.1 Document D3 represents the closest prior art and discloses in figure 1 and the corresponding parts of

the description a work rig with most of the features of the independent claim (as explained with regard to the main request). The subject-matter of the independent claim differs therefrom only in that

- (a) each rotation motor is arranged to transmit rotational movement over a toothed gear unit; and
- (b) the toothed gear unit is a planet gear transmission unit.

4.2 Document D3 discloses in column 1, lines 53/54 the explicit suggestion to replace the rifle bar rotation unit used in figure 1 and shown in detail in figure 2 by a gear box. This alternative is also described in column 4, lines 10/11 stating that a system of intermeshing gears can alternatively be used as the rotation mechanism for the feed beam.

4.2.1 A gear box as such is not suitable to provide for a rotation but it is implicit with the notion of a gear box having intermeshing gears that a combination of a motor with rotating drive shaft and the gear box coupled to that drive shaft shall be used.

4.2.2 It follows therefrom that, contrary to the allegation of the appellant-patent proprietor, the skilled person already receives from D3 a clear indication that the drive shown in figure 2 can be replaced by an alternative drive comprising a rotation motor with a gear box.

4.3 The skilled person following this explicit suggestion is only confronted with the task of choosing a suitable gear box.

4.3.1 Planetary gear boxes belong to common general knowledge of a person skilled in the art. In this respect, the

Board fully shares the appellant-opponent's opinion that planetary gear boxes and their advantages are widely known, this being moreover proven *inter alia* by the excerpts D18 and D19. The Board is convinced that the skilled person would consider using a planetary gear box when prompted by D3 to use a gear box, this representing an obvious choice in particular in view of its compactness.

- 4.3.2 In this context, the appellant-patent proprietor's argument that the skilled person had no reason to choose a planetary gear box cannot be followed.

Firstly, the patent in suit explains that the problem to be solved consists in finding a compact design of the device (see paragraph [0006] of the published patent). This is, however, exactly the known advantage of a planetary gear box over other types of gear boxes as indicated in D18 (section 1.1 on page 1: "the principal advantages of epicyclic gears over parallel shaft gears are considerable savings in weight and space") and D19 (page 723: "smaller packages").

Secondly, a planetary gear box is a gear box type that allows for the input axis to be co-axial with the output axis which is required to drive plate 52 and ring 50 of the drive shown in figure 2 (see D19, page 723: "concentric outputs"). It is thus not required to rebuild the angle unit as alleged by the appellant-patent proprietor, but the hydraulic drive of figure 2 only has to be replaced by a planetary gear box connected to the rotating drive shaft of a rotation motor.

- 4.3.3 The further argument of the appellant-patent proprietor, the skilled person would not exchange the

drives since the advantage of limiting the equipment's movement would be lost, is not convincing either. It is a fact that a gear box is suggested in D3 as an alternative to the hydraulic drive of figure 2, and anyway a planet gear box allows for large speed reductions so that a rotary motor could well be used even if the output rotation required is only in a limited range.

- 4.4 The Board is hence convinced that the skilled person would choose a planetary gear box coupled to the rotating drive shaft of a rotation motor and replace the drives 44 and 46 of figure 1 by this combination of gear box and motor, thus arriving at the subject-matter of the independent claim of auxiliary request 1A without any inventive activity.

Auxiliary request 2A and auxiliary request 3A

Admissibility (Article 12 RPBA 2020)

5. The Board decided to neither admit auxiliary request 2A nor auxiliary request 3A.

- 5.1 Auxiliary requests 2A and 3A were filed with letter dated 21 December 2022 and correspond to auxiliary requests 2A and 3A filed with the appellant-patent proprietor's grounds of appeal.

However, neither auxiliary request 2A nor auxiliary request 3A formed basis for the appealed decision or were part of the opposition proceedings.

- 5.2 The Board is not aware of any circumstances justifying the filing of these requests only during appeal proceedings. There was neither a new line of argument

raised by the opponents during oral proceedings in opposition proceedings nor a surprising turn in the opposition division's decision.

- 5.2.1 The appellant-patent proprietor alleged in their grounds of appeal that auxiliary request 2A would *"represent the features of the claims that were granted during opposition, only written in a clearer manner than the granted claims"*. The request hence should be admitted because *"the merits of the claims have been considered when considering the claims granted during opposition"* (page 18 of grounds, second paragraph). With letter dated 21 December 2022, the appellant-patent proprietor further alleged that the added feature were *"very uncomplicated and provide an unambiguous feature to the claim"* such that *"it provides a determination over the prior art"* (page 6, last four paragraphs).

The Board disagrees with the view that the independent claim of the auxiliary request 2A would claim the same as the granted independent claim since the position of the gear box units was not specified in the granted independent claim but is first specified with the feature

"the toothed gear units are positioned outside of the intermediate portion, between the angle unit and the boom, and between the angle unit and the equipment, respectively"

which was added to the independent claim of auxiliary request 2A. Auxiliary request 2A is thus a new request only presented in appeal proceedings.

Furthermore, whether the added feature is uncomplicated and restricts the scope of the claim is not a relevant criterion for admitting a request under Article 12(6)

RPBA 2020; what counts is whether the request should have been submitted in first instance proceedings and whether the circumstances of the appeal case justify their admittance.

5.2.2 With regard to auxiliary request 3A, the appellant-patent proprietor argued that the feature added to the independent claim

"wherein the planet gear transmission units (19,20), respectively, each with a desired number of steps, are connected to an outgoing axis in the form of a rotation ring (21,22), respectively, which are fastenable to the boom (9,11) and to a fastening bracket (26) of the equipment (13), respectively."

would be one of the features present in the auxiliary request 3 deemed inventive by the opposition division.

This might be true but still does not justify why this request was only presented in appeal proceedings.

5.3 Auxiliary requests 2A and 3A therefore should have been submitted in opposition proceedings prior to the opposition division's decision to maintain the patent in amended form, thus allowing for a decision of the opposition division on these requests (Article 12(6) RPBA 2020).

Auxiliary request 4D

Admissibility (Article 12 RPBA 2020)

6. Auxiliary request 4D corresponds not literally but in content to auxiliary request 3 filed during oral proceedings before the opposition division on which the appealed decision was based.

Admissibility of this request was not challenged by the appellant-opponent.

Clarity (Article 84 EPC)

7. The expression introduced in claim 1 of auxiliary request 4D ("*planet gear transmission unit with a desired number of steps*") is taken from the description and is therefore open for an examination under Article 84 EPC (G 3/14).
8. As argued by the appellant-opponent, the Board takes the view that it is not clear what are the "*steps*" that are referred to.
 - 8.1 The expression is only used on page 6, lines 13, of the application as filed but no explanation is given about its meaning.
 - 8.2 In the decision under appeal (see point 124), clarity of this expression is discussed solely in the context of what is intended by "*a desired number*" of steps, and the opposition division concluded that this means "more than one step according to circumstances". From the minutes of the oral proceedings (page 8), however, it appears that also the meaning of "*steps*" was discussed and that the proprietor submitted that this term implied that there could be some intermediate features (e.g. shims) to fasten the shaft to the boom.

In their reply dated 15 October 2020, the appellant-patent proprietor submitted (see point 3.1.2) that "*It should be clear that the term "desired number of steps" relates to gearing steps from the fact that the planet gear transmission units are connected to an outgoing axis, such that it is steps of the respective planet*

gear transmission unit to the respective outgoing axis that are referred to".

- 8.3 In the Board's view neither the explanations given at the oral proceedings before the opposition division nor the - different - explanations submitted in writing during appeal proceedings make clear what the "steps" are.

Moreover, the appellant-patent proprietor did not submit - neither in response to the corresponding objection under Article 84 EPC raised by appellant-opponent in their statement of grounds of appeal (see point 3) nor in response to the Board's statement questioning the clarity of the term "steps" in point 13.2 of the communication under Article 15(1) RPBA, any evidence that the term "steps" in the context of a planet gear transmission unit has a well-recognised meaning in the art and that it exactly means what is intended by the appellant-patent proprietor.

- 8.4 In fact during the oral proceedings before the Board various possible interpretations were discussed:

- (a) The steps of the planetary gear transmission unit are the pinions used in the planetary gear transmission unit.
- (b) The steps are the different ratios of transmission possible with one and the same planetary gear transmission unit, i. e. the number of possible gear changes.
- (c) The steps refer to the number of planetary gears arranged in series, i. e. to the number of stages of the planetary gear transmission unit, each stage being a planetary gear train having sun, planet(s)

and ring gears.

8.5 The appellant-patent proprietor alleged that the skilled person would understand that the alternative (c) is the one that falls under the terms of the claim. However, in the absence of any evidence as pointed out above, this can only be seen as an unsubstantiated allegation. As a result, it can only be speculated what the term "steps" means and therefore also the other, substantially different alternative interpretations are likewise justified.

8.6 The appellant-patent proprietor also stated during the oral proceedings that in any case, the expression was not limiting the claim because there was no limitation imposed on the number of steps, a desired number of steps implying that there could be one or more steps.

However, in order for a skilled reader to determine the matter for which protection is sought, and thus for the claim to meet the requirements of Article 84 EPC, the skilled reader must be in a position to understand what a "step" is (in the context of the claim), as the claims requires such step(s) to be present.

8.7 The wording of the independent claim hence does not allow to clearly and unambiguously define the intended limitations for the claimed device.

9. None of the requests of the appellant-patent proprietor is hence allowable.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



A. Vottner

G. Pricolo

Decision electronically authenticated