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Datasheet for the decision of 31 August 2016

Case Number: T 2049/14 - 3.2.05

Application Number: 04810941.7

Publication Number: 1730407

IPC: F15B15/26

Language of the proceedings: EN

Title of invention:
Motion control apparatus with backlash reduction

Applicant:
Nexen Group, Inc.

Relevant legal provisions:
EPC 1973 Art. 54, 111(1)

Keyword:
Novelty - yes
Remittal to the examining division - yes

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Case Number: T 2049/14 - 3.2.05

D E C I S I O N
of Technical Board of Appeal 3.2.05
of 31 August 2016

Appellant: (Applicant)	Nexen Group, Inc. 560 Oak Grove Parkway Vadnais Heights, MN 55127 (US)
Representative:	Timothy George Pendered RGC Jenkins & Co. 26 Caxton Street London SW1H 0RJ (GB)
Decision under appeal:	**Decision of the examining division of the European Patent Office posted on 14 April 2014 refusing European patent application No. 04810941.7 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	M. Poock
Members:	H. Schram
	J. Geschwind

Summary of Facts and Submissions

I. The appellant (applicant) filed a notice of appeal on 24 June 2014 against the decision of the examining division, posted on 14 April 2014, by which European patent application No. 04 810 941.7 was refused. The statement setting out the grounds of appeal was filed on 25 August 2014.

The examining division held that the subject-matters of claims 1 and 17 of the main request and of the first auxiliary request filed on 6 February 2014 were not new with respect to document EP-A 0 841 120 (hereafter document D1), Article 54 EPC 1973, that claim 2 of the second auxiliary request filed during the oral proceedings before the examining division on 6 March 2014 did not meet the requirements of Article 123(2) EPC, that the subject-matter of claim 1 of the third auxiliary request filed during said oral proceedings was not new with respect to document D1, and that the subject-matters of the independent product claims 1, 8 and 10 and of the independent method claims 12 to 14 of the fourth auxiliary request, which had been filed as second auxiliary request on 6 February 2014, were not new with respect to document D1.

II. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request or first auxiliary request filed on 25 August 2014.

III. Claims 1 and 17 of the main request read as follows:

"1. Motion control apparatus for use with a rod (14), with the rod having an axis (24) defining an axial

direction, with the rod being shiftable in the axial direction, the apparatus comprising,

a housing (26) having an inside housing surface forming a hole to receive the rod along the axial direction;

a piston (18) mounted in the inside housing surface of the housing that is moveable between a rod motion controller engaged position for restraining axial movement of the rod and a rod motion controller unengaged position in which the rod is free to move axially;

an end cap (44) slideably mounted on the inside housing surface of the housing;

a friction collar (12) mounted between the housing and the end cap, with the housing providing a restraint for the friction collar preventing its movement in a first axial direction, with an engaging force being generated by the friction collar on the rod when the piston is moved to the rod motion controller engaged position,

characterised in that

the hole in the housing (26) extends therethrough, extending through the apparatus,

in that the end cap (44) provides a restraint for the friction collar (12) preventing its movement in the axial direction opposite to the first,

and further characterised by a backlash reducer (88A, 88B, 88C) for positioning the end cap (44) with respect to the housing (26) to eliminate any space between the end cap (44) and the friction collar (12) and between the friction collar (12) and the housing (26) and hence leave no space tor movement of the friction collar (12) with respect to the housing (26) in either axial direction when the piston (18) is in the rod motion controller engaged position.”

"17. Method comprising:

providing an annular housing (26) with an internal passage large enough to accommodate a rod (14) there through;

mounting a friction collar (12) into the housing (26), with the housing providing a restraint for the friction collar preventing its movement in a first axial direction, with the friction collar positioned to selectively hold the rod (14) when the rod is inserted in the internal passage;

mounting an end cap (44) into the housing (26) after the mounting of the friction collar (12), with the end cap providing a restraint for the friction collar preventing its movement in the opposite axial direction;

applying a force to the end cap (44) after mounting into the housing (26), to position the friction collar (12) with respect to the housing to eliminate any space between the end cap and the friction collar and between the friction collar and the housing; and

holding the position of the end cap (44) with respect to the housing, preventing movement of the friction collar (12) with respect to the housing (26) when the friction collar is selctively holding the rod, to reduce backlash in operation."

IV. In support of its requests, the appellant submitted the following:

The pre-characterising part of claim 1 of the main request was based on document D1. The clamping device known from this document had a housing 2 with a blind hole, which did not extend through the housing (unlike the invention, cf the first characterising feature of said claim 1). The second characterising feature of claim 1 was to do with the end cap. In the claimed

apparatus, the friction collar was prevented from moving in one axial direction by the housing and was prevented from moving in the opposite axial direction by the end cap. In contrast, in the device known from document D1 the friction collar ("collet 10") was prevented from moving in one axial direction, namely downwards, because it was seated against annular shoulder 22 of housing 2. However, the end cap ("upper sleeve 21") was not able to prevent friction collar 10 from moving in the opposite axial direction, ie upwards, since end cap 21 was connected to housing 2 via resilient element 20. The third characterising feature of claim 1 was the backlash reducer. The clamping device known from document D1 did not have a backlash reducer and did not teach or in any way suggest reducing backlash.

Backlash in rod control mechanisms was the undesirable extra bit of movement that could occur after locking the rod, caused by design and manufacturing tolerances within the components and/or their assembly. It typically occurred when the external force acting on the rod changed direction.

The phenomenon of backlash was not mentioned anywhere in document D1. This was not altogether surprising, because backlash was of no consequence in relation to the device disclosed in said document. In the absence of any specific teaching or indication, it would not be at all obvious to modify the device of document D1 to include provision to reduce backlash. Accordingly, the provision of apparatus with a backlash reducer as claimed in claim 1 was not in any way obvious from this document. For similar reasons as noted above, the method as claimed in claim 17 was both clearly novel and not obvious having regard to document D1.

Reasons for the Decision

1. The appeal is admissible.

MAIN REQUEST

2. The invention

The invention relates to a motion control apparatus for use with a rod, which uses a backlash reducer to substantially reduce or eliminate backlash in said apparatus.

The apparatus for motion control of a rod has an annular housing to receive the rod there through, a piston mounted inside the housing, an end cap slideably mounted on the inside housing surface and a friction collar having an outside surface in the shape of a cylinder, mounted between the housing and the end cap, which is capable to grab the rod. The general design of a rod clamp device having a friction collar, whereby the rod extends through the device, is known in the art, see eg document D2, Figure 4, and document D3, Figure 1.

The amount of motion of the friction collar, after being allowed to engage, is defined as backlash and is undesirable because the additional motion of the rod may be unwanted, see page 9, lines 12 to 14, of the application as filed. The cause of backlash is that rod retaining mechanisms are typically manufactured with specified manufacturing tolerances, which may induce backlash, see page 1, lines 15 to 24, page 8, lines 3 to 8. In particular, the friction collar will backlash by an amount up to the space between the end cap and

the internal retaining ring, the space between the end cap and the friction collar and the space between the friction collar and the housing, see page 7, lines 15 to 20. The backlash reducer substantially reduces or eliminates the space created after manufacturing parts with specified tolerance dimensions.

3. *Allowability of the amendments, Article 123(2) EPC*

3.1 Claim 1 of the main request differs from claim 1 as filed, apart from the insertion of reference signs, in that

(i) the word "shiftable" has been replaced by the expression "being shiftable";

(ii) the expression "with the apparatus comprising, in combination:" has been replaced by the expression "the apparatus comprising,";

(iii) the expression "there through" has been deleted;

(iv) the expression "engaged position and a rod motion controller unengaged position" has been replaced by the expression "engaged position for restraining axial movement of the rod and a rod motion controller unengaged position in which the rod is free to move axially";

(v) the expression "to allow motion of the end cap in the axial direction" has been deleted;

(vi) the expression "with the housing providing a restraint for the friction collar preventing its movement in a first axial direction" has been added after the expression "and the end cap";

(vii) the expression "with the rod" has been replaced by the expression "on the rod"; and

(viii) the last part of the claim, ie "and a backlash reducer ... position." has been deleted and replaced by the characterising part "characterised in that ... position.".

The amendments (i) to (vii) pertain to the preamble of the claim. A basis for the feature that the hole through the housing receives the rod there through (cf amendment (iii)), is page 2, lines 5 to 7, and Figure 1 of the published version of the application as filed (hereafter application as filed). A basis for the feature that "the rod is free to move axially" when not engaged (cf amendment (iv)) is page 5, lines 31 to 33, of the application as filed. A basis for the feature that "the housing providing a restraint for the friction collar" (cf amendment (vi)) is page 6, line 3, of the application as filed. The other amendments to the preamble are of an editorial nature.

Amendment (viii) pertains to the characterising part of claim 1. A basis for its first characterising feature is page 5, lines 17 and 18 and Figure 1 of the application as filed. A basis for the second characterising feature is page 6, line 3, of the application as filed. A basis for the third characterising feature is for example page 10, lines 20 to 22 and lines 29 to 32, page 12, lines 4 to 7, and claim 17 of the application as filed.

3.2 Claim 17 of the main request differs from claim 17 as filed, apart from the insertion of reference signs, in that

(a) the expression "a housing" has been replaced by the expression "an annular housing";

(b) the expression "with the housing providing a restraint for the friction collar preventing its movement in a first axial direction" has been added before the expression "with the friction collar";

(c) the expression "with the end cap providing a restraint for the friction collar preventing its movement in the opposite axial direction" has been added after the expression "with the friction collar";

(d) the expression "with the end cap, the friction collar and the housing being in a relative position" has been replaced by the expression "to position the friction collar (12) with respect to the housing";

(e) the term "relative" in the expression "holding the relative position of the end cap" has been deleted;

(f) the expression "the friction collar and the housing" has been replaced by the expression "with respect to the housing, preventing movement of the friction collar (12) with respect to the housing (26) when the friction collar is selctively holding the rod,".

A basis for the feature "annular housing" (cf amendment (a)) is page 5, line 13. Amendment (b) corresponds to amendment (vi) to claim 1. Amendment (c) corresponds to the second characterising feature of claim 1. The effect of "applying a force to the end cap (44) after mounting into the housing (26)" (cf the fourth step of method claim 17) is that the friction collar (12) is

positioned with respect to the housing (as expressed by amendment (d)), in such a way that any space between the end cap and the friction collar and between the friction collar and the housing is eliminated. While the fifth and last step of method claim 17 as filed read "holding the relative position of the end cap, the friction collar and the housing [to reduce backlash in operation]", method claim 17 of the main request requires that "the position of the end cap (44) with respect to the housing" (obtained by the fourth step) is hold, which makes the term "relative" superfluous, cf amendment (e). It is clear that the effect of "holding the position of the end cap (44) with respect to the housing" prevents "movement of the friction collar (12) with respect to the housing (26)" when the friction collar is holding the rod, cf amendment (f).

3.3 The amendments to claims 1 and 17 as filed thus meet the requirements of Article 123(2) EPC.

4. *Novelty, Article 54 EPC 1973*

4.1 Document D1 discloses (see column 4, lines 10 to 19, and lines 53 to 57, and Figure 1) a clamping device of the type adapted to hold and fix a rod by a collet having a housing with an upper end wall 2a, a lower end wall (bottom wall) 2b and a barrel portion 2c and is fixedly secured to a table T. A support rod 4 is inserted into the housing 2. The collet 10 shown in Figure 3 is mounted together with an upper sleeve 21 on top of it into the housing, whereby collet 10 and upper sleeve 21 are pushed to a stopper 22 of the lower end wall 2b by a resilient force of a resilient member 20 made of rubber between the upper end wall 2a and upper sleeve 21.

It may be noted that if upper sleeve 21 is considered to correspond to the end cap 44 in claim 1 of the main request, the feature "an end cap (44) slideably mounted on the inside housing surface of the housing" of the preamble of said claim is not disclosed in document D1. Whilst the upper sleeve 21 provides a restraint for the collet, the collet with the upper sleeve 21 are not completely restricted in their motion with respect to the housing, in view of the presence of resilient member 20. Document D1 does therefore not disclose the second characterising feature of claim 1 of the main request. It does also not disclose the first characterising feature of claim 1 of the main request, namely "with the rod extending through the apparatus".

4.2 It follows that the subject-matter of claim 1 of the main request is new vis-à-vis document D1. This holds mutatis mutandis for claim 17 of the main request.

5. The examining division has not yet decided whether the application meets all the requirements of the EPC, including the question of inventive step, Article 56 EPC 1973. It is thus considered appropriate to remit the case to the department of first instance for further prosecution, Article 111(1) EPC 1973.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the examining division for further prosecution.

The Registrar: The Chairman:

D. Meyfarth M. Poock

Decision electronically authenticated