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**Datasheet for the decision
of 24 January 2025**

Case Number: T 1182/23 - 3.2.07

Application Number: 08875686.1

Publication Number: 2364397

IPC: E21B44/00

Language of the proceedings: EN

Title of invention:

METHOD AND APPARATUS FOR REDUCING STICK-SLIP

Patent Proprietor:

National Oilwell Varco, L.P.

Opponent:

ENGIE Electroproject B.V.

Headword:

Relevant legal provisions:

EPC Art. 54(2), 56

Keyword:

Novelty - (yes)

Inventive step - (yes) - technical effect derivable from
application as originally filed (yes)

Decisions cited:

Catchword:



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Case Number: T 1182/23 - 3.2.07

D E C I S I O N
of Technical Board of Appeal 3.2.07
of 24 January 2025

Appellant: ENGIE Electroproject B.V.
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Respondent: National Oilwell Varco, L.P.
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
26 April 2023 concerning maintenance of the
European Patent No. 2364397 in amended form.**

Composition of the Board:

Chairwoman A. Beckman
Members: V. Bevilacqua
E. Mille

Summary of Facts and Submissions

- I. The appeal was filed by the opponent (appellant) against the decision of the opposition division posted on 26 April 2023 to maintain European patent No. 2 364 397 in amended form according to the third auxiliary request.
- II. In preparation for oral proceedings, the board gave its preliminary opinion in a communication pursuant to Article 15(1) RPBA, according to which the appeal was likely to be dismissed.
- III. The appellant responded in substance to the board's communication with letter of 23 December 2024.
- IV. Oral proceedings before the board took place on 24 January 2025.
At the conclusion of the proceedings the decision was announced. Further details of the oral proceedings can be found in the minutes.
- V. The appellant (opponent) requested
 - that the decision under appeal be set aside and that the patent be revoked,
 - alternatively,
 - that the fourth auxiliary request be not admitted into the appeal proceedings
 - or, alternatively,
 - that the case be remitted to the opposition division for further prosecution on the basis of the fourth to ninth auxiliary requests.
- VI. The respondent (patent proprietor) requested

- that the appeal be dismissed, i.e. that the patent be maintained as upheld by the opposition division according to the third auxiliary request (main request),
or alternatively, when setting aside the decision under appeal,
- that the patent be maintained in amended form on the basis of any of the fourth and fifth auxiliary requests, wherein the fourth auxiliary request was first filed with the reply to the statement of grounds of appeal,
or further alternatively,
- that the case be remitted to the opposition division for further prosecution on the basis of any of the fifth to ninth auxiliary requests,
or further alternatively, in the event that the case is not remitted to the opposition division, that the patent be maintained in amended form on the basis of any of the fifth to ninth auxiliary requests.

VII. The following document, cited in the appealed decision, will be referred to in the present decision:

A7: Van den Steen, L., "Suppressing Stick-Slip-Induced Drillstring Oscillations: A Hyperstability Approach", PhD thesis, University of Twente, 1997.

VIII. Independent claim 1 of the third auxiliary request (main request in appeal proceedings), which was considered by the opposition division as being in compliance with the requirements of the EPC, reads as follows (the feature numbering used in the statement of grounds of appeal has been added by the Board):

1 A method of damping stick-slip oscillations in a drill

string,

2 wherein the stick-slip oscillations comprise torsional waves propagating along said drill string, which method comprises the steps of:

3 a) damping said stick-slip oscillations using a drilling mechanism at the top of said drill string; and

4 b) controlling the speed of rotation of said drilling mechanism using a PI controller; characterised by the step of

5a c) tuning said PI controller so that said drilling mechanism absorbs most torsional energy from said drill string at a frequency that is at or near a frequency of said stick-slip oscillations by adjusting an I-term of said PI controller to be dependent on an approximate period of said stick slip oscillations and on the effective inertia of said drilling mechanism,

5b according to $I = \omega_s^2 J$ where ω_s is an approximate or estimated fundamental angular frequency of said stick-slip oscillations and J is the effective inertia of said drilling mechanism

5c whereby said drilling mechanism has a frequency dependent reflection coefficient of said torsional waves, which reflection coefficient is substantially at a minimum at or near said frequency of stick-slip oscillations, and

6 wherein the stick-slip oscillations are damped without string torque or drive torque being provided in a feedback loop for the PI controller."

IX. The arguments of the parties relevant for the decision are dealt with in detail in the reasons for the decision.

Reasons for the Decision

1. Novelty over A7

1.1 The opposition division found that the subject-matter of claim 1 of auxiliary request 3 was novel over the disclosure of document A7 (see appealed decision, II. 14), the only distinguishing feature being feature 6 thereof:

"wherein the stick-slip oscillations are damped without string torque or drive torque being provided in a feedback loop for the PI controller".

1.2 The appellant contests the above findings arguing that A7 discloses, on page 31, two novelty destroying embodiments, namely:

- a "basic version", and
- a "dual implementation".

1.2.1 *Novelty objection based on the "dual implementation"*

The appellant argues that the expressions "string torque" and "drive torque" used in feature 6 should be interpreted literally to refer only to actual torque (a force multiplied by the distance from the point of application of the force to an axis of rotation). This is because there is a technically meaningful distinction between providing information from which torque could be derived versus directly providing actual torque.

The claimed absence of torque feedback is therefore realized also if a signal directly or indirectly

representing torque, instead of torque itself, is provided in a feed-back loop.

This is the case for the "dual implementation" mentioned at page 31, described in detail in section 2.2 and depicted in figure 2.1 at page 28, where a signal V_T , representing torque, but distinct therefrom, is fed back.

In fact section 2.2 of document A7, focussing on the "dual implementation" in detail (see page 36), describes signal V_T as merely "providing information on the torque at the shaft".

The appellant submitted that this deliberate choice of language indicates that no actual torque signal is present in the feedback loop.

1.2.2 *Novelty objection based on the "basic version"*

The appellant also argued that on page 31 of A7, in section 2.1.1, a "basic version" is described as being deprived of torque feedback, as claimed.

The appellant emphasized that this "basic version" encompasses a complete and enabling disclosure of a method of damping stick-slip oscillations in a drill string comprising all the features of claim 1.

This is because the mention of the "basic version" at page 31 of A7 must be read in the context of the document A7 as a whole, from which the skilled person understands that this "basic version", although not having been described in detail, stands on equal technical footing with the "dual implementation".

In fact, document A7 establishes, on page 31, these two distinct but strictly interrelated implementations of the system.

The explicit disclosure, on page 38 of A7, that the transfer functions are "each other's reciprocals" and, that "all the basic equations are all the same; only the causal direction has been reversed" establishes a complete technical equivalence between the two embodiments.

Therefore, according to the appellant, the disclosure of A7 must be read as an integrated whole, where the features implied by these basic mathematical relationships apply equally to both implementations.

The appellant therefore submits that as the skilled person would understand this equivalence as an inherent feature of the technical disclosure, then teachings regarding the dual implementation, such as those given in sections 2.2 (see in particular pages 36 and 38) and 2.3 of A7, also apply to the "basic version".

1.3 The respondent's arguments on novelty over A7 are more convincing, for the following reasons.

1.3.1 Novelty objection based on the "dual implementation"

The appellant's interpretation of "string torque" and "drive torque", which constitutes the basis for the novelty objection based on the "dual implementation" is not followed by the board.

A skilled reader of claim 1 would understand these expressions to rather cover signals or parameters representing torque, than torque itself (i.e. physical

forces whose point of application has a distance from an axis of rotation).

Interpreting this expression as only indicating actual torque (force x distance) makes no technical sense in the context of claim 1.

This is because PI controllers, upon which the claimed method is based, process electronic signals, such as voltage, and cannot directly operate with torques, physical forces or distances.

The subject-matter of claim 1 is therefore new over the "dual implementation".

1.3.2 *Novelty objection based based on the "basic version"*

The board fully concurs with the respondent that the rather cursory mention of a "basic version" in the introductory section of section 2.1.1 of A7 (page 31) does not constitute a clear and unambiguous disclosure of a method for damping stick-slip oscillations using a PI controller.

The passage on page 31 does not contain any information on how to implement a method of damping stick-slip oscillations in a drill string using the basic version.

Contrary to what has been argued by the appellant the features disclosed in sections 2.2 and 2.3 of document A7 cannot be automatically read into the basic version merely because of the alleged mathematical reciprocity between these implementations.

The mathematical reciprocity between versions does not extend to practical implementation details, which remain specific to each version.

Sections 2.2 and 2.3 of A7 contain specific technical teachings directed exclusively to the dual implementation, and extending these teachings to the basic version would go beyond the direct and unambiguous disclosure of the document.

In addition, section 2.3 of A7 explicitly states "It is assumed that the feedback circuit is intended for retrofit into a conventional commercial drive. These are usually of the dual type".

This explicit focus on dual implementation represents a deliberate choice to address the commercially prevalent configuration.

1.4 As a consequence of the above, the appellant failed to convincingly demonstrate the incorrectness of the findings of the opposition division under section II.14 of the appealed decision.

2. Inventive step in view of A7

2.1 The opposition division acknowledged inventive step over A7 (see appealed decision, II.15).

2.2 The appellant argues that starting from the "dual implementation" disclosed in A7, and taking the only distinguishing feature (feature 6) into account, the objective technical problem should be formulated as how to provide an alternative thereto.

Formulating the problem as the provision of an alternative is correct, according to the appellant, because A7 clearly states that the transfer functions

of the basic version and the dual implementation are reciprocal to one another (see page 38).

The appellant also argues that the relationship between the distinguishing feature and the advantages mentioned in paragraphs [0009] and [0105] of the patent in suit has not been demonstrated.

On the contrary, it is clear from the description that these advantages specifically apply to the so called "active systems", whereby the claimed method, as explained in paragraph [0009] of the patent in suit is related to a "passive system".

The skilled person, looking for such an alternative, would therefore naturally look at the disclosure of the "basic version" in which, according to the appellant, the stick-slip oscillations are damped without string torque or drive torque being provided in a feed-back loop for the PI controller.

As the transfer functions of the basic version and of the dual implementation are each other's reciprocal (see page 38 of A7), there would be no particular technical difficulty for the skilled person, guided by the disclosures given on pages 31, 36 and 38 of A7, discussed above, to implement feature 6, shown in the "basic version", into the method of damping stick-slip oscillations in a drill string according to the "dual implementation".

- 2.3 The inventive step objection of the appellant is not convincing, already because the objective technical problem at the basis thereof (the provision of an alternative) has not been formulated in line with the

principles established in the jurisprudence.

- 2.3.1 According to the established case law (see the Case Law of the Boards of Appeal, 10th Edition 2022, CLB in the following, I.D.4.1) the objective technical problem must be derived from effects directly and causally related to the technical features of the distinguishing features of the claimed invention.

In the present case, contrary to what has been alleged by the appellant, paragraphs [0009] and [0105] of the patent in suit establish a clear causal link between the absence of torque feedback (feature 6) and the reduction in complexity and cost achieved through the elimination of additional sensors.

The allegation of the appellant that these advantages specifically apply to the so called "active systems" has no basis in the patent in suit.

Paragraph [0009] of the patent in suit states:

"In contrast to some earlier systems the present invention is passive in the sense that neither string torque nor drive torque is needed in a feed-back loop. Accordingly damping can be achieved without the need for additional sensors to measure string torque, that otherwise increases complexity and cost."

According to paragraph [0105]:

"The system comprises a PI type drive speed controller being tuned so that it effectively dampens torsional oscillations at or near the stick-slip frequency. It is passive in the sense that it does not require

measurement of string torque, drive torque or currents, as alternative systems do."

Both of these passages therefore disclose effects of the distinguishing feature which also specifically apply to the so called "passive systems".

For the above reasons the board concurs with the respondent that the objective technical problem must be formulated to encompass the achievement of these effects.

The problem cannot be formulated as the provision of an alternative in the present case because, due to the above effects, it cannot be concluded that the only contribution of the invention over the prior art is to propose something different therefrom.

- 2.3.2 The argument of the appellant that there would be no particular technical difficulty for the skilled person to implement feature 6, coming from the "basic version", into the method according to the "dual implementation" is also not convincing.

This is because, even if the absence of any technical difficulty would be proven, still no teaching has been identified by the appellant that would motivate a skilled person to do so. A7 provides no indication of any benefit to using the basic version without torque feedback for damping.

To determine whether the claimed invention, starting from the closest prior art and the objective technical problem, would have been obvious to the skilled person, the boards apply the "could-would approach" (see the CLB, I.D.5).

This means asking not whether the skilled person could have carried out the invention, but whether it would have done so in the expectation of solving the underlying technical problem or in the expectation of some improvement or advantage.

Thus, the point is not whether the skilled person could have arrived at the invention by modifying the prior art, but rather whether, in expectation of the advantages actually achieved (i.e. in the light of the technical problem addressed), it would have done so because of promptings in the prior art.

- 2.4 As a consequence of the above, the appellant also failed to convincingly demonstrate the incorrectness of the findings of the opposition division under section II.15 of the appealed decision.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairwoman:



G. Nachtigall

A. Beckman

Decision electronically authenticated