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**Datasheet for the decision
of 12 April 2022**

Case Number: T 1590/19 - 3.4.02

Application Number: 10166703.8

Publication Number: 2397829

IPC: G01L1/12, G01L3/10

Language of the proceedings: EN

Title of invention:
Dynamic signal torque sensor

Patent Proprietor:
ABAS Inc.

Opponent:
Trafag AG

Headword:

Relevant legal provisions:

EPC Art. 54
RPBA Art. 12(4)
RPBA 2020 Art. 13(2)

Keyword:

Novelty main request - (no)

Late-filed auxiliary requests - admitted (no)

Decisions cited:

T 0584/17, T 0989/15, T 0259/94

Catchword:



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Case Number: T 1590/19 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 12 April 2022

Appellant: Trafag AG
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
25 March 2019 concerning maintenance of the
European Patent No. 2397829 in amended form.**

Composition of the Board:

Chairman R. Bekkering
Members: C. Kallinger
T. Karamanli

Summary of Facts and Submissions

- I. The opponent (appellant) filed the appeal against the opposition division's interlocutory decision finding that, on the basis of the main request, the patent as amended (hereinafter "the patent") met the requirements of the EPC. The appellant requested that the decision be set aside and that the patent be revoked in its entirety.

- II. In its reply to the appellant's statement of grounds of appeal, the respondent (patent proprietor) requested that the appeal be dismissed and that the patent be maintained in amended form in accordance with the main request filed with the letter dated 21 December 2018. As an auxiliary measure, the respondent requested that the decision under appeal be set aside and that the patent be maintained as amended on the basis of the claims according to auxiliary requests 1 to 6 as filed with the letter dated 21 December 2018 or auxiliary requests 7, 8, 9a, 9b, 10, 11a, 11b and 12 as filed with the letter dated 4 December 2019.

- III. Together with a notification of a summons to oral proceedings dated 14 October 2021, the board sent a communication pursuant to Article 15(1) RPBA 2020 in which it set out its preliminary views, *inter alia* with respect to Article 54 EPC and the admittance of the respondent's auxiliary requests.

- IV. With a letter dated 8 March 2022, sent in reply to the summons to oral proceedings, the respondent commented on the board's preliminary opinion, maintained auxiliary requests 1 and 9b, filed amended claims

according to auxiliary request 13 and withdrew all other pending auxiliary requests.

V. Oral proceedings before the board were held on 12 April 2022.

VI. The parties' final requests were as follows.

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

The respondent (patent proprietor) requested, as the main request, that the appeal be dismissed, and alternatively, that the decision under appeal be set aside and that the patent be maintained as amended on the basis of the claims of auxiliary request 1 filed by letter dated 21 December 2018 (first auxiliary request), on the basis of the claims of auxiliary request 9b filed by letter dated 4 December 2019 (second auxiliary request) or on the basis of the claims of auxiliary request 13 filed by letter dated 8 March 2022 (third auxiliary request).

VII. The following document will be referred to in this decision:

D12 G. Hinz, H. Voigt, "*Magnetic Sensors*", Volume 5, Chapter 4, "*Magnetoelastic Sensors*", 1989, pages 98 to 152

VIII. Independent claim 1 of the main request, on which the decision under appeal was based, reads as follows. The feature numbering as used in the decision under appeal has been added by the board:

- 1.1 Force measuring sensor comprising:
- 1.2 a magnetic field generating unit (10),
- 1.3 a magnetic field sensing unit (20), wherein the magnetic field sensing unit comprises a first magnetic field sensing element (22) and a second magnetic field sensing element (24),
- 1.4 an [sic] magnetic field coupling element (30), wherein the magnetic field coupling element (30) is adapted to couple the magnetic field generating unit (10) and the magnetic field sensing unit (20),
- 1.5 wherein the magnetic field coupling element (30) comprises a force input section (32) and a force output section (36),
- 1.6 wherein the magnetic field coupling element (30) comprises a material section (34) between the force input section (32) and the force output section (36), the material section having a permeability depending on a force impact,
- 1.7 wherein the magnetic field generating unit (10) is adapted to couple a magnetic field to the magnetic field coupling element (30);

characterized in that

- 1.8 the first magnetic field sensing element (22) has a main sensing characteristic in a first sensing direction (23) and the second magnetic field sensing element (24) has a main sensing characteristic in a second sensing direction (25), wherein the first sensing direction and the second sensing direction are different from each other,

- 1.9 the magnetic field sensing unit (20) including the first magnetic field sensing element (22) and the second magnetic field sensing element (24) is adapted to detect angular changes of magnetic flux lines of the magnetic field generated by the magnetic field generating unit (10);
- 1.10 wherein the angular changes of the magnetic flux lines are an indicative to a force being applied to the magnetic field coupling element (30), and
- 1.11 wherein the force applied to the magnetic field coupling element is determined based on the angular changes of magnetic flux lines detected by the magnetic field sensing unit including the first magnetic field sensing element (22) and the second magnetic field sensing element (24).

Reasons for the Decision

- 1. Main request - novelty over document D12

The main request is based on claims 1 to 13 filed as the main request with the letter dated 21 December 2018.

- 1.1 The opposition division found that document D12 failed to disclose features 1.9 and 1.11 of claim 1, arguing in particular that "*although the magnetic field sensing unit of D12 is probably sensitive to angular changes of magnetic flux lines, in the case of D12 within the coupling element, it is not adapted to detect these changes*" (see decision, point 15.7).
- 1.2 The appellant argued that D12, in particular Figure 4-14 in view of Figure 4-9 and the corresponding

description parts, disclosed all the features of claim 1.

- 1.3 The respondent argued that D12 failed to disclose features 1.8, 1.9 and 1.11 of claim 1.

Feature 1.8

The pick-up coils A and B shown in Figure 4-14 were all oriented in a radial direction and were therefore all sensitive to the same component of the magnetic field, i.e. the radial component of a cylindrical co-ordinate system, which the skilled person would inevitably consider in the arrangement shown in Figure 4-14.

In addition, each magnetic sensing unit shown in Figure 4-14 consisted of the respective two sensing coils A and B, offset only in the axial direction but arranged at the same radial position.

Therefore, the sensing directions of the first and second magnetic field sensing elements did not differ from one another as required by feature 1.8.

Features 1.9 and 1.11

Figure 4-14 of D12 disclosed several individual magnetic sensing units, each consisting of an N-S-A-B quadruplet. Each of these sensing units worked according to the same measuring principle as the cross torductor sensor shown in Figure 4-9 and was only capable of detecting changes in the amplitude of the radial component. In addition, the two magnetic sensing elements of each unit, i.e. the pairs of axially offset detection coils A and B in Figure 4-14, had the same measuring direction. In contrast, the opposed patent pursued a fundamentally different approach based on multiple different sensing directions, which made it

possible to detect orientation-dependent information. As the arrangement in Figure 4-14 of D12 was not capable of detecting at least two components of the magnetic field above the shaft, the magnetic sensing unit of D12 was not adapted to detect angular changes of magnetic flux lines of the magnetic field generated by the magnetic field generating unit as required by feature 1.9. As a consequence, the force applied to the magnetic field coupling element could not be determined on the basis of the angular changes of magnetic flux lines as set out in feature 1.11.

1.4 The board is not convinced by the respondent's arguments for the following reasons.

Feature 1.8

The magnetic field sensing unit shown in Figure 4-14 comprises a plurality of pick-up coils A and B which are arranged in two circles around a shaft (see in particular Figure 4-14 a)). As the sensing direction of each individual magnetic field sensing element is orthogonal to the surface of the shaft, the sensing directions of the individual magnetic field sensing elements are different from each other. Therefore, Figure 4-14 of D12 discloses feature 1.8.

Features 1.9 and 1.11

The basic working principle of the torque transducer shown in Figure 4-14 is the same as that disclosed in Figure 4-9 (see D12, page 113, first paragraph, last sentence). Figure 4-9 and the corresponding description on pages 108 and 109 of D12 disclose that a magnetic field, generated by two magnetic field generating elements (excitation coils P1 and P2), is coupled into

a magnetic field coupling element (shaft). When a force (torque T) is applied to the coupling element, the magnetic flux pattern is distorted as shown in Figure 4-9 b). This distortion of the flux pattern induces in the two magnetic field sensing elements a signal voltage which is a function of torque (see D12, page 109, first paragraph). The board is therefore of the opinion that the magnetic field sensing unit shown in Figure 4-14 of D12 is sensitive to angular changes of magnetic flux lines.

Contrary to the respondent's argument (see its letter dated 4 December 2019, page 6, first and third paragraphs), the claim does not specify that the sensor is adapted to detect at least two components of the magnetic field above the shaft because feature 1.9 very generally specifies "*detect[ing] angular changes of magnetic flux lines of the magnetic field generated by the magnetic field generating unit*". In addition, contrary to the respondent's view, the claim does not reflect that directional information with regard to the "*true directional change*" of the magnetic flux lines is detected (see respondent's letter dated 8 March 2022, page 8, second paragraph and page 12, third paragraph). The board is therefore of the opinion that the sensor arrangement disclosed in Figure 4-14 of D12 is adapted to detect angular changes of magnetic flux lines of the magnetic field generated by the magnetic field generating unit. Therefore, D12 discloses feature 1.9.

Furthermore, chapter 4.4 of D12 generally relates to "*Torque Sensors*" and D12 explicitly discloses that the signal change in the sensing coils (S1 and S2 in positions A and B) is a function of the applied torque (see page 109, first paragraph). Therefore, D12 discloses that the force applied to the magnetic field coupling element is determined on the basis of the

angular changes of magnetic flux lines detected by the magnetic field sensing unit as defined in feature 1.11.

In conclusion, the board is of the opinion that the embodiment shown in Figure 4-14 of D12 discloses all the features of claim 1 of the respondent's main request. The subject-matter of claim 1 of the main request therefore lacks novelty in view of document D12 (Article 54 EPC).

2. First and second auxiliary requests - admittance

The first auxiliary request is based on the claims according to auxiliary request 1 as submitted during the first-instance opposition proceedings with the letter dated 21 December 2018.

The second auxiliary request is based on the claims according to auxiliary request 9b as submitted for the first time with the respondent's reply to the appeal dated 4 December 2019.

2.1 The appellant argued that although its objections against the patent had been known at the latest with the statement of grounds of appeal, the respondent had only substantiated the first and second auxiliary requests with its letter sent in reply to the summons to oral proceedings and thus only shortly before the oral proceedings. In addition, the amendments in the second auxiliary request were complex, related to unsearched subject-matter and gave rise to new objections. Therefore, these requests should not be admitted into the procedure.

2.2 The respondent argued that the first and second auxiliary requests should be admitted into the proceedings for the following reasons.

Article 12(2) RPBA 2007

The first auxiliary request had been substantiated with the submission dated 21 December 2018 before the first-instance oral proceedings and was subsequently maintained in the response to the grounds of appeal. In addition, the amendments in the first auxiliary request were self-explanatory, so no further explicit substantiation was necessary.

With respect to the second auxiliary request, the respondent had emphasised in the response to the grounds of appeal that the amendments included in the second auxiliary request were not disclosed in the pertinent prior art and further improved the detection and determination mechanism. These explanations, although short, constituted sufficient substantiation. In addition, the amendments to this request were self-explanatory, so no further explicit substantiation was necessary.

In conclusion, the first and second auxiliary requests had been substantiated with the reply to the statement of grounds of appeal as required by Article 12(2) RPBA 2007.

Article 13(2) RPBA 2020

Even if no explicit or implicit substantiation had been presented with the reply to the statement of grounds of appeal, there were exceptional circumstances which justified taking the first and second auxiliary

requests into consideration at this stage of the appeal proceedings.

Firstly, the board had not interpreted D12 as disclosing the subject-matter of claim 1 at any point in the proceedings until the communication annexed to the summons to oral proceedings.

Secondly, the respondent could not understand why the board considered feature 1.8 to be disclosed in D12. This was of particular importance as the board's opinion differed from the opposition division's finding.

Thirdly, the board had raised a new argument in its communication under Article 15(1) RPBA 2020 in stating that "*the claim does not define that the magnetic field above the coupling element is measured*".

Lastly, the first and second auxiliary requests:

- became part of the proceedings at the latest with the reply to the statement of grounds of appeal
- concerned only two auxiliary requests
- did not present complex issues
- had not been objected to by the appellant before the oral proceedings

2.3 The respondent's arguments are not convincing for the following reasons.

Article 12(2) RPBA 2007

In the case in hand, the statement of grounds of appeal was filed before the date on which the revised version of the Rules of Procedure of the Boards of Appeal (RPBA 2020) entered into force, i.e. 1 January 2020 (see OJ

EPO 2019, A63 and Article 24(1) RPBA 2020). Thus, in accordance with Article 25(2) RPBA 2020, Article 12(4) to (6) RPBA 2020 does not apply. Instead, Article 12(4) of the Rules of Procedure of the Boards of Appeal in the 2007 version (RPBA 2007 - see OJ EPO 2007, 536) continues to apply.

Article 12(4) RPBA 2007 stipulates *inter alia* that the statement of grounds of appeal (Article 12(1)(a) RPBA 2007) or the reply (Article 12(1)(b) RPBA 2007) has to be taken into account by the board if it meets the requirements of Article 12(2) RPBA 2007. Under Article 12(2) RPBA 2007, the statement of grounds of appeal and the reply must contain a party's complete case and should, *inter alia*, expressly specify all the facts, arguments and evidence relied on.

In its reply to the appellant's statement setting out the grounds of appeal, the respondent did not present any arguments with respect to where the amendments in the first auxiliary request could be found in the application as filed or why they overcame the objections raised by the appellant. Merely referring to the first-instance proceedings does not meet the requirement of expressly specifying all the arguments made in support of the request to uphold the decision under appeal.

In the respondent's reply to the statement of grounds of appeal, the second auxiliary request was presented as a further fallback position in which the amendments clarified "*a specific embodiment in order to further improve the detection and determination mechanism*", and it was stated that "*the respective amendments are not disclosed in the prior art*". In view of the extensive amendments and the lack of substantive arguments with

respect to the objections raised by the appellant, the board is of the opinion that these statements fail to sufficiently substantiate the second auxiliary request.

Lastly, the board does not share the respondent's view that the first and second auxiliary requests are self-explanatory. For the first auxiliary request, the respondent did not provide any basis in the application as filed for the amendment. Moreover, the question arises, for instance, how a force vector, which in general has components in three dimensions, can be determined by only two sensor elements. In addition, both the patent and D12 measure torque, which can also be expressed by a vector. Therefore, the question of why claim 1 would be novel over D12 also arises.

In conclusion, the board is of the opinion that the first and second auxiliary requests have not been sufficiently substantiated with the respondent's reply to the statement of grounds of appeal as required by Article 12(2) RPBA 2007.

Article 13(2) RPBA 2020

It was not until its reply to the summons to oral proceedings filed on 8 March 2022 that the respondent expressly provided substantive arguments as to why the claims according to the first and second auxiliary requests overcame the objections raised by the appellant in its statement setting out the grounds of appeal. Therefore, these requests could only be considered as from the date they had been substantiated for the first time. As a consequence, these requests constitute an amendment to the respondent's appeal case within the meaning of Article 13(2) RPBA 2020, which applies to the case in hand pursuant to Article 25(1)

and (3) RPBA 2020 as the summons to oral proceedings was notified after the date on which RPBA 2020 entered into force.

The respondent's arguments with respect to Article 13(2) RPBA 2020 are, however, not convincing for the following reasons.

Firstly, in interpreting D12 as disclosing the subject-matter of claim 1, the board was following the line of reasoning presented by the appellant in its statement of grounds of appeal. This objection was therefore not new.

Secondly, the board's finding that feature 1.8 was disclosed in D12 was explained in the board's communication and is the same as the opposition division's finding: "*feature 1.8 is disclosed in D12*"; see contested decision, point 15.7. The board therefore did not differ from the opposition division's finding as alleged by the respondent.

Thirdly, in stating that "*the claim does not define that the magnetic field above the coupling element is measured*", the board was replying to the respondent's arguments that the "*changed flux line density generates a distorted magnetic field above the magnetic field coupling element*" and that "*the sensor is adapted to detect at least two components of the magnetic field above the shaft*" (see respondent's reply to the statement of grounds of appeal, page 6, first and third paragraphs). Therefore, the board did not raise a new argument in its communication.

The other arguments presented by the respondent (only two requests, no complex issues, *prima facie*

allowability) relate to criteria set out in Article 13(1) RPBA 2020. At the third level of the convergent approach applicable in appeal proceedings in accordance with the RPBA 2020, the boards of appeal are free to use or not use the criteria set out in Article 13(1) RPBA 2020 when deciding, in the exercise of their discretion in accordance with Article 13(2) RPBA 2020, whether to admit an amendment made at this stage of the proceedings (see e.g. decisions T 584/17 and T 989/15). The board is, however, of the opinion that the criteria set out in Article 13(1) RPBA 2020, referred to by the respondent, do not constitute exceptional circumstances within the meaning of Article 13(2) RPBA 2020 since these criteria cannot justify not submitting these requests until this late stage of the appeal proceedings.

The board is therefore of the opinion that there are no exceptional circumstances which could justify taking the first and second auxiliary requests into consideration at this stage of the proceedings, i.e. after notification of the summons to oral proceedings.

With reference to decision T 259/94, the respondent also argued that the appellant had only objected to the auxiliary requests at the oral proceedings and that therefore the principle of "*volenti non fit injuria*", applied and these requests should be admitted.

However, the board is not convinced by this argument. In case T 259/94, the board of appeal applied the principle of "*volenti non fit injuria*" because the respondent had not raised any late-filing objections against the introduction of a document into the appeal proceedings. In the case in hand, however, the

appellant explicitly objected to the admission of the first and second auxiliary requests.

2.4 In conclusion, the board is of the opinion that the first and second auxiliary requests can only be considered as from 8 March 2022, when they were substantiated for the first time, and that these requests therefore constitute an amendment to the respondent's appeal case within the meaning of Article 13(2) RPBA 2020. As there are no exceptional circumstances which have been justified with cogent reasons by the respondent, the first and second auxiliary requests are not taken into account in view of Article 13(2) RPBA 2020.

3. Third auxiliary request - admittance

The third auxiliary request is based on the claims according to auxiliary request 13 as submitted with the letter dated 8 March 2022, which the respondent sent in reply to the board's notification of a summons to oral proceedings.

3.1 The appellant argued that it saw no reason to admit this new request at this stage of the appeal proceedings.

3.2 The respondent argued that, for the same reasons as given for the first and second auxiliary requests (see point 2.3 above), there were exceptional circumstances which justified taking the third auxiliary request into consideration in accordance with Article 13(2) RPBA 2020.

3.3 For the same reasons as given above for the first and second auxiliary requests (see point 2.3 above), the board is of the opinion that there are no exceptional circumstances which have been justified with cogent reasons by the respondent. Therefore, the third auxiliary request is not taken into account in view of Article 13(2) RPBA 2020.

4. Since none of the respondent's requests is allowable, the patent must be revoked (Article 101(3)(b) EPC).

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. Chavinier-Tomsic

R. Bekkering

Decision electronically authenticated