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**Datasheet for the decision
of 15 March 2024**

Case Number: T 0304/21 - 3.4.03

Application Number: 15201994.9

Publication Number: 3037850

IPC: G01V8/20

Language of the proceedings: EN

Title of invention:

LIGHT CURTAIN SENSITIVITY OPTIMIZATION

Patent Proprietor:

Rockwell Automation Technologies, Inc.

Opponent:

Leuze electronic GmbH + Co. KG

Relevant legal provisions:

EPC Art. 52(1), 54(1), 56, 101(3)(b), 111(1)
RPBA 2020 Art. 12(8)

Keyword:

Novelty - (yes)
Inventive step - (no)



Beschwerdekammern

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Case Number: T 0304/21 - 3.4.03

D E C I S I O N
of Technical Board of Appeal 3.4.03
of 15 March 2024

Appellant: Leuze electronic GmbH + Co. KG
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted on
22 February 2021 concerning maintenance of the
European Patent No. 3037850 in amended form.

Composition of the Board:

Chairman T. Häusser
Members: J. Thomas
T. Bokor

Summary of Facts and Submissions

- I. This is an appeal of the opponent against the interlocutory decision of the opposition division maintaining European patent EP 3 037 850 B1 as amended according to the auxiliary request submitted during the oral proceedings before the opposition division.
- II. The appellant (opponent) requested in its notice of appeal to set aside the appealed decision and to revoke the European patent in its entirety. It further requested oral proceedings as an auxiliary measure.
- III. In its letter of reply the respondent (patent proprietor) did not pronounce any explicit request, in particular it did not request oral proceedings. It only argued that the subject-matter of claim 1 of the auxiliary request underlying the interlocutory decision should be considered new and inventive.
- IV. The parties were summoned to attend oral proceedings before the board on 16 January 2024 and a communication under Article 15(1) RPBA was issued. By letter dated 13 December 2023, the respondent informed the board that it would not be represented at the oral proceedings. The board cancelled the oral proceedings.
- V. Reference is made to the following document:
D4: EP 2 492 714 B1
- VI. The wording of claim 1 of the auxiliary request underlying the impugned decision, on the basis of which the opposition division maintained the patent, is the following (the feature numbering is added by the board

according to the numbering used in the opposition division's decision):

"(1.1) A light curtain control system for tuning a light curtain's operating margin individually for each channel to facilitate optimal object detection in a range of variable operating conditions, comprising:

(1.2) a memory (416) that stores computer-executable components; and

(1.3) a processor (414), operatively coupled to the memory, that executes the computer-executable components, the computer-executable components comprising:

(1.4) an emitter control component (404) configured to select an emitter element of a channel of a light curtain and instruct the emitter element to emit a light beam;

(1.5) a margin measurement component (408) configured to determine an operating margin for the channel based on a measured signal generated by a receiver element of the channel in response to receipt of the light beam; and

(1.6') a margin adjustment component (410) configured to adjust the operating margin for the channel based on a comparison of the operating margin with a defined margin criterion, wherein the defined margin criterion is given as a multiple of a minimum signal strength required by the receiver element to register the receipt of the light beam, characterised in that the margin adjustment component is further configured to adjust the operating margin by:

(1.6a) increasing a beam intensity setting of the emitter element if the operating margin is to be increased to satisfy the defined margin criterion, and if a maximum beam intensity is reached, increasing an amplifier gain setting of the receiver element until

the determined operating margin satisfies the defined margin criterion; and
(1.6b) decreasing the amplifier gain setting of the receiver element if the operating margin is to be decreased to satisfy the defined margin criterion, and if the amplifier gain setting of the receiver element reaches a minimum value, decreasing the beam intensity until the operating margin satisfies the defined margin criterion."

VII. The appellant's arguments are summarised as follows:

The subject-matter defined in claim 1 was not new over document D4 or at least not inventive in view of this document. The disputed feature was feature 1.6', which was considered to be disclosed in Figure 4 of document D4 or at least rendered obvious by this figure.

VIII. The respondent's arguments are summarised as follows:

Feature 1.6' represented the distinguishing feature over the disclosure of document D4 and was not obvious for the skilled person. The technical problem discussed in document D4 was the prevention of saturation. However, D4 did not discuss other technical considerations such as avoiding adjacent channel signal bleed through and minimizing the receiver element's susceptibility to ambient light noise. The feature 1.6' provided a simple criterion for enabling the robust functioning of the light curtain in a manner that was not suggested by D4 or the other cited prior art.

Reasons for the Decision

1. The appeal is admissible.

2. Procedural matters

2.1 The respondent did not state any explicitly requests in any of its submissions. However, from the content of its submissions in the appeal proceedings, in which the patent as maintained was defended, it was clear to the board that the respondent implicitly requested that the appeal be dismissed. This was also so stated in the board's communication under Article 15(1) RPBA, and the respondent did not subsequently contest it.

2.2 The board also indicated its preliminary opinion that at least one line of the appellant's arguments was convincing (communication, point 8.5). On this basis, the patent should be revoked. Therefore, the board considered the case in fact to be ready for a final decision, since it could decide in favour of the only party (the appellant) requesting oral proceedings as an auxiliary measure. Nevertheless, the parties were summoned to attend oral proceedings.

2.3 By letter of 13 December 2023, the respondent informed the board that it would not attend the oral proceedings scheduled for 16 January 2024. Thereafter the board decided to cancel the oral proceedings as they were deemed to serve no purpose. The present decision is issued in writing pursuant to Article 12(8) RPBA.

3. Novelty

3.1 The appellant argued that document D4 disclosed all features defined in claim 1 of the auxiliary request underlying the impugned decision. The respondent argued that feature 1.6' was not disclosed in document D4.

3.2 The board maintains its opinion as set out in its communication under Article 15(1) RPBA.

3.2.1 Document D4 deals with a light curtain arrangement with an optimised sensitivity, and discloses the following features (references in parentheses refer to D4):

(1.1) a light curtain control system (title) for tuning a light curtain's operating margin individually for each channel to facilitate optimal object detection in a range of variable operating conditions (paragraph [0015]), comprising:

(1.2) a memory that stores computer-executable components (part of evaluation unit 22; see claim 9 and paragraph [0054]); and

(1.3) a processor (part of evaluation unit 22, see paragraphs [0050] and [0054]), operatively coupled to the memory, that executes the computer-executable components, the computer-executable components comprising:

(1.4) an emitter control component configured to select an emitter element of a channel of a light curtain and instruct the emitter element to emit a light beam (control unit 20, see paragraphs [0050] and [0054]);

(1.5) a margin measurement component configured to determine an operating margin for the channel based on a measured signal generated by a receiver element of the channel in response to receipt of the light beam (claim 1, page 10, lines 22 to 23; claim 9, page 11, lines 23 to 27); and

(1.6') a margin adjustment component configured to adjust the operating margin for the channel based on a comparison of the operating margin with a defined margin criterion (paragraph [0054]; the comparison must be present in order to determine the described thresholds), ~~wherein the defined margin criterion is~~

~~given as a multiple of a minimum signal strength required by the receiver element to register the receipt of the light beam, wherein~~
the margin adjustment component is further configured to adjust the operating margin by:

(1.6a) increasing a beam intensity setting of the emitter element if the operating margin is to be increased to satisfy the defined margin criterion, and if a maximum beam intensity is reached, increasing an amplifier gain setting of the receiver element until the determined operating margin satisfies the defined margin criterion (paragraphs [0017], [0027] and [0054]); and

(1.6b) decreasing the amplifier gain setting of the receiver element if the operating margin is to be decreased to satisfy the defined margin criterion, and if the amplifier gain setting of the receiver element reaches a minimum value, decreasing the beam intensity until the operating margin satisfies the defined margin criterion (paragraphs [0017], [0027] and [0054]).

- 3.2.2 The board understands the feature "*the defined margin criterion is given as a multiple of a minimum signal strength required by the receiver element to register the receipt of the light beam*" with the meaning of an integer multiple of a minimum signal strength for the following reasons.

If the term "*a multiple of*" were to mean any real-valued multiple, as opposed to an integer multiple, then the margin criterion would be entirely void as any value could be chosen. There would be no reason to choose this particular wording referring to the minimal signal strength as it could merely be indicated that the margin criterion could take any value. Moreover, a smaller absolute value than the minimum signal strength

would then also be possible, which would make no technical sense. On the other hand, if it was intended that the margin criterion could be any value higher than the claimed minimal signal strength then a wording such as "*a value higher than*" or "*a value larger than*" rather than a wording using "*a multiple of*" would be expected.

Also the overall technical context of the patent, in particular by paragraph [0025] of the patent, supports this interpretation. This paragraph indicates that the margin criterion is selected as "*e.g., 2X, 3X, etc.*", where "*X*" is the claimed "*minimum signal strength*".

Therefore, the board interprets the term "*a multiple of*" as "*an integer multiple of*".

- 3.2.3 The appellant argues that Figure 4 of document D4 disclosed a margin criterion with a value of approximately twice the minimum signal strength.

However, the board does not find this convincing as Figure 4 is a schematic representation that does not indicate any quantitative values for the various indicated thresholds or signal intensities (S1 to S4).

- 3.2.4 It is settled case law of the Boards that quantitative values cannot be deduced from schematic figures which do not explicitly show the relevant features with quantitative values (*Case Law of the Boards of Appeal of the EPO (CLBA), 10th Edition, 2022, I.C.4.6*).

- 3.2.5 Therefore, Figure 4 of document D4 does not teach a margin criterion S4 of (approximately) twice the minimum signal strength S1, as it does not provide quantitative values for the signal levels shown. No

quantitative value can be derived from Figure 4. This figure only shows that the reference light S4 should be higher than the two lower thresholds S1 and S3 and lower than the upper threshold S2.

3.2.6 Thus, the claimed feature "*the defined margin criterion is given as a multiple of a minimum signal strength required by the receiver element to register the receipt of the light beam*" (part of feature 1.6') is not clearly and unambiguously disclosed in document D4.

3.2.7 Therefore, the subject-matter defined in claim 1 of the auxiliary request underlying the decision is new over document D4 (Articles 52(1) and 54(1) and (2) EPC).

4. Inventive step

4.1 Closest prior art

The opposition division considered document D4 to be an appropriate starting point for the assessment of inventive step. This was not disputed by the parties. The board agrees.

4.2 Distinguishing feature

As explained above under point 3.2 with subpoints, the subject-matter defined in claim 1 differs from the device known from document D4 by the feature "*the defined margin criterion is given as a multiple of a minimum signal strength required by the receiver element to register the receipt of the light beam*".

4.3 Technical effect, problem to be solved

The distinguishing feature does not solve a technical problem in order to provide a technical effect which is not yet present in the embodiment of Figure 4 of document D4. Contrary to the respondent's submission, it is irrelevant whether the technical problem or the technical effect is explicitly mentioned in document D4. The relevant point is that a robust margin criterion is already provided in the system of D4, since it is disclosed in Figure 4 in combination with paragraph [0054] that the operating margin should be sufficiently large to avoid that e.g. ageing of parts or temperature fluctuations could trigger a spurious security signal. The only technical effect objectively obtained by the distinguishing feature is that concrete values are provided for the margin criterion. The disclosure of document D4 is silent in this respect.

The objective technical problem is therefore merely how to implement the light curtain control system of D4.

4.4 Obviousness

The desired implementation using the selection of the margin criterion as a (small) integer multiple, e.g. two or three times, of the minimum necessary signal strength is held to be trivial. This implementation would be considered by the skilled person in view of the teaching of D4, Figure 4 and paragraph [0054] mentioned above. There is no technical difficulty whatsoever in providing the concrete claimed margin criterion. Nor are there any considerations that would deter the person skilled in the art from doing so.

Consequently, the distinguishing feature does not go beyond an obvious, straightforward solution which a skilled person would realise in view of document D4.

The board concludes that the subject-matter defined in claim 1 of the auxiliary request underlying the decision does not involve an inventive step over the teaching of document D4 and the skilled person's common general knowledge (Articles 52(1) and 56 EPC).

5. Conclusion

Since the subject-matter of claim 1 of the only request to be considered in the present appeal proceedings, i.e. the auxiliary request underlying the impugned decision, does not fulfil the requirements of the EPC, the patent cannot be maintained as decided by the opposition division. Therefore, the patent has to be revoked (Articles 101(3)(b) and 111(1) 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:



S. Sánchez Chiquero

T. Häusser

Decision electronically authenticated