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Datasheet for the decision of 29 September 2021

Case Number: T 0838/17 - 3.4.01

Application Number: 07115689.7

Publication Number: 1901092

IPC: G01S17/10, G01S7/487

Language of the proceedings: EN

Title of invention:
Distance measuring apparatus

Patent Proprietor:
Hokuyo Automatic Co., Ltd.

Opponent:
SICK AG

Headword:
Distance measurement / Hokuyo Automatic

Relevant legal provisions:
EPC Art. 56, 100(a), 113
EPC R. 106
RPBA Art. 12(4)
RPBA 2020 Art. 13(2)

Keyword:
Grounds for opposition - Novelty and inventive step in view of the same document - linked grounds (yes)
Discretionary decision of opposition division reverted (yes)
Late-filed facts and evidence - considered (yes)
Auxiliary request submitted after summons - considered (yes)
Inventive step - all requests (no)

Decisions cited:
G 0007/95, T 0131/01

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Case Number: T 0838/17 - 3.4.01

D E C I S I O N
of Technical Board of Appeal 3.4.01
of 29 September 2021

Appellant: (Opponent)	SICK AG Erwin-Sick-Strasse 1 79183 Waldkirch (DE)
Representative:	Ludewigt, Christoph Sick AG Intellectual Property Erwin-Sick-Strasse 1 79183 Waldkirch (DE)
Respondent: (Patent Proprietor)	Hokuyo Automatic Co., Ltd. 1-9-6 Edobori Nishi-ku Osaka-shi Osaka, 550-0002 (JP)
Representative:	Betten & Resch Patent- und Rechtsanwälte PartGmbB Maximiliansplatz 14 80333 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 22 February 2017 rejecting the opposition filed against European patent No. 1901092 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	P. Scriven
Members:	A. Medeiros Gaspar
	R. Winkelhofer

Summary of Facts and Submissions

I. This is an appeal by the opponent against the Opposition Division's decision to reject the opposition against European Patent 1901092.

II. On filing the opposition, the opponent indicated, on EPO Form 2300, the grounds of lack of novelty and lack of an inventive step (Article 100(a) EPC) and submitted as evidence, among other, the following documents:

D1 US 5638163

D2 US 2005/0200833 A1

P1 US 5949530

III. The notice of opposition, however, pursued a single line of attack, namely, lack of inventive step based on documents D1 and D2.

IV. A novelty attack based on the disclosure of P1 was brought forward for the first time only after expiry of the opposition period.

V. The Opposition Division found that this late novelty attack introduced a fresh ground of opposition and that it lacked relevance *prima facie*. A subsequent inventive step attack, also based on P1, was also found to lack relevance *prima facie*. Hence, the Opposition Division

did not consider either of the attacks based on P1.

VI. The combination of documents D1 and D2 was found not to prejudice the maintenance of the patent in view of inventive step. Consequently, the opposition was rejected.

VII. On appeal, the opponent pursued the objections based on D1, D2 and P1 and requested that the decision be set aside and the patent revoked.

VIII. In reply, the proprietor argued against consideration of the attacks based on P1 and requested the appeal be dismissed, or that the patent be maintained on the basis of one of two auxiliary requests, filed with the reply to the appeal.

IX. After the Board's summons to oral proceedings, the proprietor submitted a further auxiliary request, to stand between the two previously submitted auxiliary requests; and the opponent argued against consideration of the then third (former second) auxiliary request.

X. The Board held oral proceedings, at the end of which the parties maintained their requests as indicated above.

XI. Before closure of the debate, the proprietor raised an objection under Rule 106 EPC, which reads as follows:

The decision on the main request seems to be based on an evidence, namely an alleged embodiment of prior art document P1, which has not been discussed or mentioned in the proceedings before. The patent proprietor did not have the opportunity to present his comments on said alleged embodiment, contravening Art. 113 EPC.

XII. Claim 1 of the main request (as granted) reads as follows (the squared brackets indicate the feature numbering adopted by the parties):

[1] *A distance measuring apparatus (1) comprising*
[2] *a light source (3) for outputting a pulsed measurement light towards a measurement target object (100);*
[3] *a light receiver (5) for detecting a reflected light from said measurement target object (100);*
[4] *a time difference detector (728) for detecting a delay time between an output timing of said measurement light and a detected timing of said reflected light by said light receiver (5); and*
[5] *a calculator (71) for calculating a distance from said measurement target object (100) on the basis of the delay time detected by said time difference detector (728),*
wherein said light receiver (5) is provided with

[6] *a photodiode (PD) for photo-electrically converting said reflected light, and*
[7] *an amplifying circuit (50) for amplifying an output of said photodiode(PD),*
characterized in that said light receiver (5) furthermore comprises
[8] *a diode (D)*
[8.1] *which is connected in series between said photodiode (PD) and an earth ground,*
[8.2] *adapted to clamp a light current generated in said photodiode (PD),*
[8.3] *make the amplifying circuit (50) be operated without arrival at a supersaturated state, and*
[8.4] *if said photodiode (PD) is turned off, input an opposite direction current that is caused by diffusion of minor carriers accumulated in a junction capacitor of said diode (D) with a reverse recovery property to said amplifying circuit (50), as a current that is proportional to a total charge amount of a current flowing through the photodiode (PD) during reception of the reflected light,*
and said distance measuring apparatus (1) further comprising:
[9] an integration processor *for integrating an output of said amplifying circuit (50) between detection of said reflected light by said photodiode (PD) and disappearance of the reverse direction*

current of said diode (D) after said photodiode (PD) is turned off; and
[10] *a distance compensator for compensating said delay time or said distance in accordance with an output of said integration processor.*

XIII. Claim 1 of the first auxiliary request adds, to feature 8.4 of the main request, the limitation

... wherein the Diode (D) is not a Schottky diode ...

XIV. Claim 1 of the second auxiliary request adds to claim 1 of the first auxiliary request a further limitation to the end of feature 8.1:

...
such that the cathode of the diode (D) is grounded,
...

XV. Claim 1 of the third auxiliary adds to claim 1 of the main request (claim 1 of the patent), after feature 10, the limitation

... wherein the diode (D) is a silicon diode with a reverse recovery time of about ten-odd nanoseconds.

Reasons for the Decision

The invention

1. The invention concerns time-of-flight distance measuring apparatuses. Such devices operate by sending out a pulse of light so as to be reflected by an object. By measuring the time difference between the emission of the light pulse and its return, it is possible to determine the distance to the object (paragraphs [0001] - [0003] of the patent).

2. One problem with such devices is that there can be very large variations in the intensity of the reflected light received, depending on the object and its distance. If the returned light is very faint, the output of the photodetector will need to be amplified appropriately; but if the light is very intense, then the amplifier might no longer operate linearly, or might even become unstable (figures 13A and 13B; paragraphs [0004-0007]). Thus, the time-of-flight estimate is affected by the intensity of the detected light.

3. This problem is solved (paragraph [0012] and figure 4A of the patent) by providing a diode between the photodiode and earth, in parallel with the amplifier, so as to clamp the current that flows into the amplifier. In this way, unstable behaviour is avoided (paragraphs [0013] and [0045] of the patent).

4. After disappearance of the pulse from the photodiode, a reverse current flows. This reverse current prolongs the output of the amplifier. The pulse output by the amplifier will consist of a part generated by the

returned light, and a prolongation due to the reverse recovery current. The latter will be longer, if the returned light is more intense, and shorter if it is weaker (see figure 4B, paragraphs [0014], [0015] and [0046] - [0049] of the patent).

5. By integrating the output of the amplifier, information on the intensity of the light pulse received is recovered, which is used to correct the time-of-flight or distance estimate (paragraphs [0015] and [0016] of the patent).

Consideration of the attacks based on document P1

6. As the Opposition Division observed, the attacks based on P1 were filed late, since they were substantiated only after the expiry of the opposition period.

7. Consideration of such a late-filed ground of opposition, and of the facts and evidence on which it was based, was at the discretion of the Opposition Division.

8. Discretionary decisions should only be overruled if they were taken on the basis of the wrong principles, without taking account of the right principles, or in an arbitrary or unreasonable way (Case Law of the Boards of Appeal, 9th edition, IV.C.4.5.2; V.A.3.5.1 b)).

9. The Opposition Division assessed the *prima facie* relevance of the attacks based on P1, which is a decisive criterion for considering late filed submissions (Case Law of the Boards of Appeal 9th ed. IV.C.4.5.3).

10. When reasoning its decision not to consider the inventive step attack based on P1 (paragraphs 27-29 of the decision), the Opposition Division took the view that the opponent's argumentation didn't go beyond reiterating that there was no difference between the subject-matter of claim 1 of the patent and the disclosure of P1. This was considered unconvincing, in view of the fact that the Opposition Division had identified a difference.

11. However, an assessment of whether a prior art document prejudices inventive step, even at *prima facie* level, needs, necessarily, to go beyond an assessment of whether that document prejudices novelty. This is because an assessment of inventive step does not stop at the identification of a difference.

12. While a lack of difference is sufficient to substantiate an inventive step objection (in the absence of a difference, there is no inventive step), in the converse direction, the identification of a distinguishing feature is not sufficient to demonstrate that the invention would not have been obvious.

13. Hence, even if the opponent's argumentation did not go beyond the statement that there was actually no difference, proper exercise of discretion would have required, at least, some explanation as to why the Opposition Division saw no reason to suspect that the difference would have been obvious.

14. However, neither the decision nor the minutes of oral proceedings contains such an explanation.

15. Therefore, the *prima facie* relevance of the inventive step attack based on P1 has to be reassessed.

16. There are several reasons to suspect that P1 might be prejudicial to the inventive step of claim 1 of the patent.

17. Given that P1:
(a) also relates to time-of-flight distance measuring apparatuses and is concerned with the same problem as the patent (P1, abstract);
(b) is a family member of the document referred to in paragraphs [0008] - [0010] of the application and is, itself, mentioned in paragraph [0011] of the patent; and
(c) was used throughout the examination proceedings as the starting point for the assessment of inventive step,
it would be rather extraordinary if it turned out not to be a good starting point for the inventive step assessment of the present invention.

18. The signal acquisition circuit of figure 6 of P1 is very similar to the signal acquisition circuit of figure 4A of the patent. Indeed, the differences the proprietor argued to exist in this regard (features 8.1 to 8.4) are, mainly, functional. However, the similarity of figure 7B of P1 and figure 4B of the patent, both depicting the pulses output by the respective signal amplification circuits, seems to suggests that the same functional features are not also present in the apparatus of P1. At least, it raises doubts as to whether any technical effect(s) can be identified.

19. Finally, P1 discloses not only the correction method referred to paragraphs [0008] - [0010] of the patent, based on a measured electrical charge requiring additional circuit elements, but also a second correction method based on the width of the pulse output by the signal acquisition circuit (P1, abstract; figure 7B). This second method appears very similar to the method of the present invention. Hence features 9 and 10 are also put into question.

20. There are, hence, good reasons to suspect that the disclosure of P1 could be prejudicial to the inventive step of claim 1 of the patent. Therefore, the inventive step attack based on P1 is *prima facie* relevant and needs to be considered.

21. There is no need to review the decision taken on the novelty attack based on P1, since novelty vis à vis P1 will necessarily be considered when carrying out the inventive step assessment starting from P1 (see also G 7/95 *Fresh grounds for opposition*, OJ EPO 1996, 626, points 7.3 and 7.4).

22. Indeed, although in G 7/95 (point 7.2) it was decided that the grounds of lack of novelty and lack of inventive step are distinct, the substantive connection between them, at least when the claimed invention is to be compared with the same prior art document in both respects, is also recognised (G7/95, point 4.4).

23. This is because, while the inventive step assessment comprises a novelty assessment (i.e. determination of possible differences), establishing novelty does not conclusively dispose of the question of whether prior art under Article 54(2) EPC prejudices the maintenance

of a patent (Case Law of the Boards of Appeal, 9th edition, IV. C. 3.4.2; T 131/01 OJ EPO 2003, 115).

24. Hence, the question to be answered is a single one, namely, whether or not the disclosure of P1 prejudices the maintenance of the patent.

The disclosure of P1

25. As already indicated, P1 relates to time-of-flight distance measuring apparatuses, and is concerned with the same problem as the present patent (P1, column 1 lines 4-21 and 57-61; column 6, line 50 - column 7, line 22; figures 3 and 4).

26. P1 discloses a time-of-flight distance measuring apparatus comprising the circuit depicted in figure 6 (reproduced in figure 13C of the patent), in which a diode is connected in parallel with a main amplifier, so as to clamp the current that flows into the amplifier. The output of this diode is further connected to ground via a capacitor, and to a further amplifier (P1 figure 6, and column 5, lines 19-55). Figure 7b depicts the waveforms at the output of the main amplifier for different intensities.

27. Finally, the apparatus of P1 comprises a control and evaluation system capable of compensating for errors in the measured time-of-flight, in dependence on either the width of the waveform output by the main amplifier or a measure of the total current that passes through the diode obtained by means of the capacitor and the further amplifier (P1, column 7, lines 23-37).

Claim 1 of the patent vis à vis P1: difference

28. The parties do not dispute that document P1 discloses a distance measuring device comprising features 1-7 of claim 1 of the patent (P1, claim 1; figure 6; column 5, lines 15-55). The Board agrees that this is the case.

29. The parties do, however, dispute whether or not features 8.1 to 8.4, 9 and 10 are also present in the apparatus of P1. In the following each of these features is discussed.

Feature 8.1

30. Figure 6 of P1 depicts the diode *connected in series between a photodiode and ground* (feature 8.1).

31. The proprietor argued that feature 8.1 required a direct connection of the diode to ground, whereas figure 6 of P1 depicted the connection via a capacitor.

32. This argument is not persuasive, since the claim does not require the connection defined to be direct.

33. Hence P1 discloses feature 8.1.

Feature 8.2

34. Figure 6 further discloses the diode as connected to the photodiode in parallel with the main amplifier.

35. By virtue of this connection the diode is adapted to *clamp the pulse current generated by the photodiode* (feature 8.2).

36. The proprietor argued that, due to the indirect connection to ground, it was possible, depending on the charge accumulated in the capacitor, that the diode might stop conducting and so stop clamping the pulse current received by the main amplifier.

37. However, P1 discloses its capacitor as capable of collecting the total charge that flows through the diode, as a measure of the total charge contained in the current pulse generated by the photodiode (column 5, lines 43-48; column 7, lines 23-29). Thus, the capacitance of the capacitor is such so as to prevent the situation described by the proprietor from occurring.

38. Additionally, even if the diode of P1 did stop conducting before the entire pulse from the photodiode had passed through it, the operation of such a diode would still result in a clamping of the pulse fed to the amplifier. Thus, the proprietor's argument fails either way.

39. Therefore, P1 also discloses feature 8.2.

Feature 8.3

40. Feature 8.3 requires the diode to be further adapted to *make the amplifying circuit be operated without arrival at a supersaturated state.*

41. The term *supersaturated* has no well-established meaning in the art, as both parties acknowledged. It requires interpretation.

42. The proprietor argued that *supersaturated* should be equated to *saturated*, but this cannot be, as both terms are employed in the patent, implying that different scenarios are meant.

43. The prefix *super* suggests that a *supersaturated state* is a state that is reached with an input current higher than one that brings the amplifier out of its linear regime, i.e into a *saturated state*.

44. Indeed, while the disclosure is not fully consistent in this regard, the term *supersaturated* appears mainly to be employed when referring to an unstable state of operation.

45. Operation of an amplifier in a non-linear regime (i.e. in a saturated state), does not, however, mean that the amplifier becomes unstable.

46. To conclude, the term *supersaturated* employed in the claim must be understood as a state beyond a mere state of non-linear response.

47. P1 disclosed its main amplifier as being allowed to operate "beyond its linear range"(P1, column 7, lines 13-17), i.e. in a saturated state.

48. This does not exclude feature 8.3 from being present in the apparatus of P1.

49. P1 also discloses that, when the amplifier is operated in a non-linear regime, the saturation effects associated with overmodulation lead to a situation in which the relevant output signal of the main amplifier is extended in time (P1, column 7, lines 17-20), and that, in some embodiments, compensation of the time-of-

flight measurement error takes place using a measurement of the pulse width (P1, column 7, lines 23-37).

50. It follows from this further disclosure that the main amplifier of P1 is operated in a stable state, outputting reproducible waveforms on the basis of which corrections can be implemented.

51. The amplifying circuit of P1 is, therefore, *operated without arrival at a supersaturated* [unstable] *state*, as defined in feature 8.3.

52. In addition, the claim defines this functional feature as resulting from the interposition of a normal diode connected to the photodiode in parallel with the amplifier.

53. Given that the same construction is present in the apparatus of P1, the same result will be achieved by the diode of P1.

54. The proprietor's argument that this function of the diode is not present in the apparatus of P1 because the diode is not directly connected to ground is, once more, not persuasive, in essence for the reasons presented above with regards to feature 8.2.

55. Therefore, P1 also discloses feature 8.3.

Feature 8.4

56. Feature 8.4 requires that, when the photodiode is turned off, the diode inputs an opposite direction current that is caused by diffusion of minor carriers

*accumulated in a junction capacitor of said diode (D) with a reverse recovery property to said amplifying circuit (50), as a current that is proportional to a total charge amount of a current flowing through the photodiode (PD) during reception of the reflec*ted light.

57. It is disputed whether the formulation of this feature excludes a Schottky diode, such as the one disclosed in figure 6 of P1.

58. This is the case, simply because Schottky diodes do not have a pn junction on which minority carriers can accumulate, with the result that any reverse recovery currents cannot be *caused by the diffusion of minor carriers accumulated in a junction capacitor of said diode*.

59. Nevertheless, claim 9 of P1 discloses the diode of as being only *preferably a Schottky diode*.

60. The proprietor argued that because claim 9 of P1 does not define a connection to ground, it concerned an embodiment different from the one disclosed in connection to figure 6, where such a connection is depicted. Therefore the disclosure of claim 9 could not be combined with that of figure 6.

61. However, the entire disclosure of P1 is made by reference to the circuit depicted in figure 6. Hence, the disclosure of claim 9 is to be seen as clarifying that the diode needs not be a Schottky diode as depicted in figure 6. The skilled person would, therefore, without further specification, understand that the diode may also be a standard pn junction

device, which comprises a junction capacitor on which minority carriers accumulate.

62. Therefore feature 8.4 is also present, in some of the embodiments of the distance measuring apparatus disclosed in P1.

Features 9 and 10

63. Feature 9 defines an integration processor *for integrating an output of said amplifying circuit (50) between detection of said reflected light by said photodiode (PD) and disappearance of the reverse direction current of said diode (D) after said photodiode (PD) is turned off* and feature 10 *a distance compensator for compensating said delay time or said distance in accordance with an output of said integration processor.*

64. As already indicated, P1 discloses its distance measuring apparatus as comprising an electronic control and evaluation system capable of compensating for errors in the time-of-flight measured (P1, column 7, lines 23-37) in dependence on:
(a) the width of the waveform output by the main amplifier (P1, column 5 lines 30-33 and 46-49, figure 7b; column 8, line 46 - column 9 line 35) and/or
(b) a measure of the total charge that passes through the diode during the reception of the current pulse, obtained by means of the capacitor and the further amplifier (P1, figure 6, column 5, lines 34-49).

65. None of these embodiments discloses feature 9, because none of the compensation methods carries out an integration of the extended current pulse output by the main amplifier.

66. In the compensation mentioned under (a), it is the width of the extended pulse output by the main amplifier that is measured (figure 7b), rather than an integration of the pulse being carried out.

67. In the compensation mentioned under (b), a measure of the total charge that passed through the diode during the reception of the current pulse is carried out using the capacitor and the further amplifier. This measure is hence obtained by integrating of the output of the further amplifier, and not by integrating the output of the main amplifier, which would correspond to feature 9.

68. The opponent argued that also the determination of the width of the extended pulse could be understood to be an integration process.

69. Such an argument is not persuasive, as the determination of a one-dimensional time interval (as depicted in figure 7b of P1) is distinct from the determination of the integral of a function of a time-varying signal, i.e. its area (as depicted in figure 4B of the patent).

70. Therefore, the apparatus of P1 does not comprise an integration processor as defined in feature 9. Consequently feature 10, referring to the result obtained by such integration processor is not disclosed in P1 either.

Claim 1 of the patent vis à vis P1: obviousness

71. As indicated above, claim 1 of the patent differs from the disclosure of P1 by the compensation method employed. Whereas the apparatus of claim 1 is configured to integrate the extended pulse output by its amplifier and compensate the time-of-flight using the result, the apparatus of P1 may carry out one of two distinct compensation methods, or a combination of them. According to one of the methods (first method) the width of the waveform output by the main amplifier is determined and used that to compensate the time-of-flight. According to the other (second method), a measure of the total charge that passed through the diode is obtained using additional circuit elements and used to compensate the time-of-flight.

72. The opponent argued lack of inventive step, starting from the embodiments employing the first method, whereas the proprietor argued in favour of inventive step in view of the second method, by reference to paragraph [0016] of the patent.

73. The Board agrees with both assessments. Relevant for this decision is, however, only the conclusion with regards to the embodiments employing the first method.

74. Claim 1 of the patent differs from those embodiments of P1 exclusively in that, instead of the width, the area of the pulse is determined by integration and used for the compensation.

75. No technical effect can be recognised as resulting from the use of the area of the extended current pulse

instead of its width, as a basis for compensating errors in time-of-flight.

76. The apparatus of claim 1 of the patent implements, therefore, an alternative normalization parameter for compensating the errors in time-of-flight to the one implemented in apparatus of P1.

77. However, the use of the area of a pulse as normalization parameter was well known in the art.

78. Hence, the skilled person, starting from the embodiments of P1 employing the first method and seeking alternative parameters, on which to base the compensation, would have considered and implemented a compensation based on the area of the extended pulse.

79. Therefore, claim 1 of the patent lacks inventive step and the main request of the patent proprietor is not allowable.

Consideration of the auxiliary requests

80. According to Article 25(2) RPBA 2020, Article 12(4) RPBA 2007 and Article 13 RPBA 2020 apply in the present case.

81. Auxiliary requests 1 and 3 were filed with the reply to the appeal. Auxiliary request 2 was added after notification of the summons to the oral proceedings before the Board.

82. With the submission of auxiliary request 2, the proprietor argued the circumstances to justify its

consideration, while the opponent did not object but rather addressed it in substance.

83. The opponent objected however against consideration of auxiliary request 3, arguing divergence with regards to the auxiliary request 2, while the proprietor argued in favour of its consideration 3, in view of the timing of its submission.

84. The Board notes that the amendments introduced with each of the auxiliary requests are straightforward (see items XIII, XIV, and XV above).

85. Furthermore, they are all directed at a more precise delimitation of the diode, so as to better distinguish the invention from the disclosure of P1, a matter that was already at the center of the dispute between the parties with regards to the main request and that gained particular relevance in the course of these appeal proceedings.

86. The auxiliary requests can, hence, be dealt with in substance without undue burden on the Board or the opponent.

87. Therefore the Board sees no reason not to consider the auxiliary requests.

Claim 1 of auxiliary request 1 vis à vis P1: inventive step

88. Claim 1 of auxiliary request 1 introduces the negative limitation that the diode *is not a Schottky diode*.

89. This feature is, for the reasons presented above (see paragraphs 56-62 above) also disclosed in P1.

90. Consequently, the reasoning presented with regards to the main request also applies to this request, which is, therefore likewise not allowable.

Claim 1 of auxiliary request 2 vis à vis P1: inventive step

91. Claim 1 of auxiliary request 2 adds, to claim 1 of the auxiliary request 1, the limitation that *the cathode of the diode is grounded*.

92. This limitation further distinguishes the invention from the disclosure of P1, since the cathode of the diode of P1 is not grounded, but instead connected to a grounded capacitor and to a further amplifier.

93. The proprietor did not argue any link to exist between this difference and the difference in the parameter employed in the compensation process, nor can a link be identified.

94. The proprietor argued the direct connection of the diode to the ground contributed to the effect of clamping the input to the amplifier. However, that effect cannot be recognised as resulting from this difference, for the reasons provided in paragraphs 40 to 55 above.

95. The direct connection of the diode to the ground is rather recognised as contributing to reducing the complexity of the circuit (as alluded to in paragraph [0009] of the patent).

96. Given the lack of a link between the effects to which the two differences contribute, the inventive step assessment is in terms of partial-problems.

97. Features 9 and 10 are dealt with in paragraphs 63 to 70 above.

98. The connection of the diode to ground does not entail an inventive step, for the following reasons.

99. The skilled person, starting from the disclosure of P1 and seeking to reduce the complexity of the signal acquisition circuit, would have realised that the capacitor and further amplifier were dispensable, and that their removal would provide a straightforward solution to the problem, without impacting the remainder of the circuit.

100. Since either difference entails an obvious solution to a technical problem, the subject-matter of claim 1 of this request also lacks an inventive step. Consequently, auxiliary request 2 is also not allowable.

Claim 1 of auxiliary request 3 vis à vis P1: inventive step

101. Clam 1 of auxiliary request 3 replaces the negative limitation introduced with auxiliary request 1 by the positive limitation that *the diode is a silicon diode with a reverse recovery time of about ten-odd nanoseconds*.

102. This limitation is not disclosed in P1 and, hence, further distinguishes claim 1 of auxiliary request 1.

103. This further difference is not linked to the difference in the parameter employed in the compensation process. Nor did the proprietor argue that there was a link.

104. Again, the situation is one of partial problems.

105. The limitation on reverse recovery time places the diode of the invention in the ordinary range of well-known diodes.

106. Therefore, the skilled person implementing the non-Schottky embodiment (P1, claim 9) would consider employing well-known silicon diodes with reverse recovery times within the defined range.

107. Therefore claim 1 of auxiliary request 3 lacks and inventive step, and this request is likewise not allowable.

On the objection raised under Rule 106 EPC

108. The objection raised by the proprietor, that the decision on the main request was based on an embodiment of prior art document P1 which had not been discussed or mentioned in the proceedings, is not justified.

109. The objection does not clearly identify the embodiment to which it refers. It might relate to the argument, raised by the proprietor at the oral proceedings, that the disclosures of figure 6 and of claim 9 of P1 concern different embodiments.

110. However, whether or not claim 1 of the patent excluded a Schottky diode, such as the one depicted in figure 6 of P1, was extensively discussed during the appeal

proceedings, not only at the oral proceedings but also in the written submissions. Auxiliary requests 1 and 2, submitted by the proprietor in reply to the appeal, were already directed at making that alleged distinction explicit.

111. In their last written submission, the opponent replied to that argument, noting that the disclosure of P1 was not limited to Schottky diodes, calling the Board's attention to the disclosure of that feature as merely optional on claim 9 of P1.

112. Finally, the fact that, at the oral proceedings, the proprietor counter-argued that the disclosures of figure 6 and claim 9 concerned different embodiments, demonstrates that they were in fact given the opportunity to present their comments on this matter.

113. That argument was, furthermore, considered by the Board (paragraphs 59 to 62).

114. The Board, therefore, fails to see how the right of the proprietor to be heard on this matter could have been infringed.

115. Consequently, the objection had to be dismissed.

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:

D. Meyfarth P. Scriven

Decision electronically authenticated