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Datasheet for the decision of 25 May 2023

Case Number: T 0792/20 - 3.5.02

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Language of the proceedings: EN

Title of invention:
Inductive rotary joint with secondary safety circuit

Patent Proprietor:
Schleifring GmbH

Opponent:
Siemens Healthcare GmbH

Relevant legal provisions:
EPC Art. 100(b), 100(a), 54, 56

Keyword:
Insufficiency of disclosure (no)
Novelty - (yes)
Inventive step - (yes)

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Case Number: T 0792/20 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 25 May 2023

Appellant: (Opponent)	Siemens Healthcare GmbH Henkestraße 127 91052 Erlangen (DE)
Respondent: (Patent Proprietor)	Schleifring GmbH Am Hardtanger 10 82256 Fürstenfeldbruck (DE)
Representative:	Lohr, Jöstingmeier & Partner Junkersstraße 3 82178 Puchheim/München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 21 February 2020 rejecting the opposition filed against European patent No. 3034001 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	R. Lord
Members:	C.D. Vassoille
	J. Hoppe

Summary of Facts and Submissions

I. The appeal of the opponent lies against the decision of the opposition division rejecting the opposition against European patent no. 3 034 001.

II. The following documents are relevant for the present decision:

O1: US 2011/0075796 A1
O7: DE 10 2010 042 124 A1
O15: Conglomerate of extracts of German industry norms, all publicly available under: https://www.din.de:
- DIN EN 60601-1 (December 2013): pages 28, 90, 91, 260
- DIN EN 60601-2-28 (November 2010): page 9
- DIN EN 60601-2-44 (November 2014): page 23
- DIN EN 60617-2 (August 1997): page 29

O16: US 2012/0262001 A1 (family member of O7)

III. In the decision under appeal, the opposition division *inter alia* came to the conclusion that the grounds for opposition under Article 100(b) EPC and Article 100(a) EPC in combination with Articles 54 and 56 EPC did not prejudice the maintenance of the patent as granted.

IV. In a communication under Article 15(1) RPBA 2020, the board informed the parties *inter alia* of their preliminary opinion according to which the board agreed with the findings of the opposition division in the contested decision.

V. Oral proceedings before the board took place on 25 May 2023 as a videoconference.

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

The respondent (patent proprietor) requested that the appeal be dismissed, or as an auxiliary measure that the patent be maintained in amended form on the basis of one of the auxiliary requests 1 to 8, filed with the reply to the grounds of appeal.

VI. Claim 1 of the patent as granted, according to the respondent's main request, reads as follows (feature numbering added in squared brackets):

"**[1.1]** Inductive power transfer circuit, comprising
[1.2a] at least an inductive rotating coupler having a primary side (100) rotably arranged against a secondary side (200),
[1.2b] the primary side (100) comprising at least a primary winding (110), the secondary side (200) comprising at least a secondary winding (210),
[1.3] a rectifier (221-224) connected to the secondary side,
[1.4] and a capacitor (230) further connected to the rectifier,
[1.5] the secondary side further having a positive output (251) and a negative output (252), for delivering a DC voltage, to a load (240) at the secondary side,
characterized in that
[1.6] one of the positive output (251) or negative output (252) is connected to a secondary ground (253) at the rotating part

[1.7] which is further coupled via a galvanic contact (280) to a protective earth (134) at the primary side (100)."

Claim 2 to 11 are dependent on claim 1.

In view of the decision on the main request, it was not necessary to reproduce the auxiliary requests here.

VII. The arguments of the appellant which are relevant for the present decision can be summarised as follows:

Article 100(b) EPC

The ground for opposition under Article 100(b) EPC prejudiced the maintenance of the patent. In particular, the skilled person would understand from the wording of feature 1.2a of claim 1 that the primary side is the rotatable part of the inductive power transfer circuit ("a primary side (100) rotably arranged against a secondary side"), which was consistent with the overall wording of claim 1. This was in contradiction with the description, which only described an embodiment in which the primary side was the stationary part of the inductive power transfer circuit. In view of these contradictions, the skilled person was not able to implement the invention as defined in claim 1.

The invention according to claim 1 also could not be put into practice, because feature 1.5 defined that the positive output and the negative output delivered DC voltage to a load at the secondary side. This was in contradiction to the secondary winding producing an AC voltage at the secondary side. The positive output and the negative output were not defined in claim 1 in

terms of their positional relationship with other components of the circuits, in particular not with the rectifier.

Article 100(a) EPC in combination with Article 54 EPC

The ground for opposition under Article 100(a) EPC in combination with Article 54 EPC prejudiced the maintenance of the patent as granted.

The "positive output" and "negative output" of the secondary side implied nothing more than a difference in the electrical potential present at the two outputs. Based on this interpretation, document O1, in particular figure 9 in connection with paragraph [0040] of the description, disclosed all features of claim 1. The respective disclosure of O1 had to be understood such that a negative output of rectifier 529a corresponded to the node below the capacitor Cs1. This negative output was connected to a secondary ground at the rotating part within the meaning of feature 1.6.

VIII. The arguments of the respondent which are relevant for the present decision can be summarised as follows:

Article 100(b) EPC

The ground for opposition under Article 100(b) EPC did not prejudice the maintenance of the patent as granted. Even if the description of the patent was not taken into account in the interpretation of claim 1, the skilled person would understand from the whole of claim 1, in particular when reading feature 1.2a together with features 1.5 and 1.6, that the secondary part referred to the rotating part. Consequently, there was also no contradiction between claim 1 and the

description of the patent. Furthermore, as concerns feature 1.5, the skilled person would understand that a positive output and a negative output for delivering a DC voltage to a load at the secondary side could, when interpreted in a technically reasonable manner, only refer to the output of the rectifier and not to the "AC-output" of the secondary winding.

Article 100(a) EPC in combination with Article 54 EPC

The ground for opposition under Article 100(a) EPC in combination with Article 54 EPC did not prejudice the maintenance of the patent as granted. Document O1 did not disclose features 1.5, 1.6 and 1.7 of claim 1. In particular, the circuit illustrated in figure 9 could not be artificially split into two independent partial circuits, because the X-ray tube only worked with anode and cathode current and thus, with the combination of the two independent controllable voltage supplies. Furthermore, the ground electrode of document O1 was to be understood as a centre tap of the circuit, which was necessary to operate the X-ray tube.

Article 100(a) EPC in combination with Article 56 EPC

The ground for opposition under Article 100(a) EPC in combination with Article 56 EPC did not prejudice the maintenance of the patent as granted. Even if the person skilled in the art had combined the teachings of documents O1 and O7, the combination would not have resulted in the subject-matter of claim 1, because neither document disclosed feature 1.6.

Reasons for the Decision

1. Ground for opposition under Article 100(b) EPC

1.1 The patent describes the invention according to claim 1 in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

Feature 1.2a

1.2 Contrary to the appellant's argument, feature 1.2a, in the overall context of claim 1, would be understood by the person skilled in the art to mean that the primary side is stationary and the secondary side is rotatable. The wording of feature 1.2a "a primary side (100) rotably arranged against a secondary side (200)", in particular the term "rotably", merely indicates that the two sides can be rotated with respect to each other.

1.3 Even if the skilled person had doubts as to the meaning of feature 1.2a in isolation, they would immediately understand from the further features 1.5 and 1.6 that it is the secondary part that is rotating. In particular, feature 1.5 explicitly states that the secondary side has a positive output and a negative output for delivering a DC voltage to a load. From this, it would be immediately apparent to the person skilled in the art that the load is provided at the rotating part, since inductive transfer of power to a rotating load is the intrinsic function of an inductive rotating coupler as defined in feature 1.2a. In addition, the "secondary ground (253) at the rotating part" according to feature 1.6 provides a further

indication to the skilled person that it is clearly the secondary part that is rotating.

1.4 In conclusion, feature 1.2a in the overall context of claim 1 is clear in that the primary side is stationary and the secondary side of the inductive rotating coupler is rotating. There is therefore nothing in claim 1, nor any contradiction with the description, which would prevent the person skilled in the art from carrying out the invention with respect to feature 1.2a of claim 1.

Feature 1.5

1.5 Feature 1.5 essentially recites that the secondary side has a positive output and a negative output providing a DC voltage to a load.

Contrary to the appellant's argument, the mere fact that claim 1 does not explicitly define the positive output and negative output to correspond to the outputs of the rectifier, does not prevent the person skilled in the art from implementing the invention in the whole range claimed.

In particular, the person skilled in the art would exclude technically nonsensical interpretations of claim 1, one of which is that the positive output and the negative output, delivering a DC voltage to a load, could be outputs of the secondary winding. On the contrary, there can be no doubt that the person skilled in the art would immediately understand that the secondary winding supplies an alternating voltage, the output of which cannot therefore correspond to the positive output and the negative output of feature 1.5, which supplies a direct voltage. Furthermore, the

skilled person would immediately understand that the DC voltage can only be supplied by the rectifier connected to the secondary side (feature 1.3), which is the only DC voltage generating element in claim 1.

1.6 Consequently, although claim 1 might not explicitly define the position of the positive and negative outputs of feature 1.5 at the secondary side of the inductive power transfer circuit, their position is nonetheless implicitly defined, because the skilled person, applying their common general knowledge, would immediately understand that the positive output and the negative output for supplying a DC voltage to a load, in the context of claim 1, can only refer to the outputs of the rectifier. The scope of claim 1 therefore does not include a non-workable embodiment, as argued by the appellant.

Result

1.7 In the light of the above considerations, the board concluded that the ground for opposition under Article 100(b) EPC does not prejudice the maintenance of the patent as granted.

2. Ground for opposition under Article 100(a) EPC in combination with Article 54 EPC

2.1 The subject-matter of claim 1 of the patent as granted is new with respect to document O1.

Interpretation of the terms "positive output" and "negative output"

2.2 An essential point in assessing the novelty of claim 1 over document O1 was the question of how the terms "positive output" and "negative output" of feature 1.5 (and feature 1.6) would be understood by a person skilled in the art.

The board notes first of all that it agrees with the appellant in that the subject-matter of claim 1 does not include the load, but is to be interpreted as being suitable for supplying a DC voltage to a load.

Notwithstanding the foregoing, the board is convinced that the skilled person would understand claim 1 to mean not only that the rectifier of the inductive power transfer circuit is adapted to supply a DC voltage to a load connectable to the secondary side via the positive output and the negative output, but to mean that the supply of the DC voltage is, of course, intended to make the load, such as an X-ray tube, operate.

The person skilled in the art would therefore at least exclude any technically meaningless interpretation of claim 1, in particular an interpretation in which the rectifier and its associated positive and negative outputs provide a DC voltage only to a partial load of a total load in a more complex system, the partial load itself not being operable on the basis of the DC voltage provided by the positive and negative outputs of the rectifier.

This understanding is entirely consistent with the overall description of the patent, which in paragraphs [0028] and [0029] in connection with figures 7 and 8

refers to a normal operation of the inductive power transfer circuit. As explained in the corresponding passages of the contested patent, the current to operate the load flows from the secondary winding via the rectifier to the capacitor and back from the capacitor via the rectifier to the secondary winding.

It is thus clear from the overall wording and context of claim 1 that the positive output and the negative output within the meaning of feature 1.5 (and feature 1.6) are to be understood in such a way that the circuit as defined in claim 1 forms a self-contained system which can be connected to a load in order to make that load function by enabling a main current flow required for that purpose to be supplied to the load and back from the load via the negative output (or via the positive output depending on the direction of the current flow).

2.3 The appellant has essentially argued that the above interpretation was too narrow and that a more general understanding of the "positive output" and a "negative output" of the secondary side was justified. Their main argument in this respect was that, although the terms "positive output" and "negative output" are normally used for the outputs of a rectifier, they imply nothing more than a difference in the electrical potential present at the two outputs, so that these terms should be understood in a relative rather than an absolute sense.

The board generally agrees with this technical understanding of the terms "positive output" and "negative output" of the rectifier. However, it does not change the fact that the person skilled in the art would interpret the claimed subject-matter in a

technically meaningful way and would therefore understand claim 1 to refer to a stand-alone inductive power transfer circuit which is capable of making a connectable load work.

"Positive output" and "negative output" in document O1

2.4 In the light of the foregoing interpretation of claim 1, the outputs of the upper rectifier 529a, as illustrated in figure 9 of document O1, cannot be considered to correspond to the positive output and negative output of the rectifier at the secondary side of the power transfer circuit within the meaning of claim 1.

The reason for this is that the rectifier 529a, although independently controllable, is part of the overall inductive power transfer system shown in figure 9 and as such is not capable of driving the load 530 on its own. Rather, the rectifier performs a sub-function in the overall system shown in figure 9, which is to independently control and deliver the voltage U_a to the anode of an X-ray tube corresponding to the load 530. The bipolar X-ray tube of figure 9 can only be operated in conjunction with the independently controllable rectifier 529b, which supplies a voltage U_k to the cathode of the X-ray tube.

The fact that both rectifiers are necessary for the operation of the X-ray tube is also apparent from the following modified figure 9, submitted by the appellant during the oral proceedings.

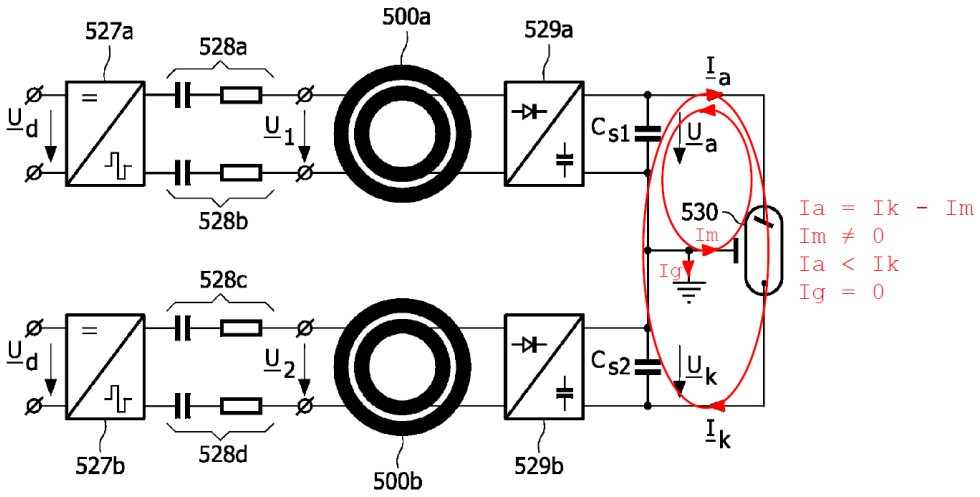


FIG. 9 (modified)

As stated by the appellant during the oral proceedings before the board, a current I_k flows between the anode and the cathode of the X-ray tube during the operation of the load, i.e. the X-ray tube 530. The appellant has also correctly submitted that backscattered electrons may induce an additional current flow I_m through the metal casing of the X-ray tube, and that this current flow is much smaller than the current I_k flowing from the anode to the cathode. The total resulting current in the load is therefore $I_a = I_k - I_m$.

It is thus clear from the overall disclosure of figure 9 in conjunction with paragraphs [0004] and [0040] of O1 that the voltage sources, during operation of the bipolar X-ray tube, generate a main current which does not flow between the outputs of only one of the two independent rectifiers 259a and 259b, but between the outputs of the two rectifiers. Otherwise, the bipolar X-ray tube of figure 9 would not work, as the respondent correctly pointed out.

Thus, considering how the skilled person would understand claim 1, it is clear that rectifier 529a and the associated outputs at the top and bottom of the capacitor Cs1 do not correspond to what claim 1 means by "positive output" and "negative output" at the secondary side as recited in feature 1.5.

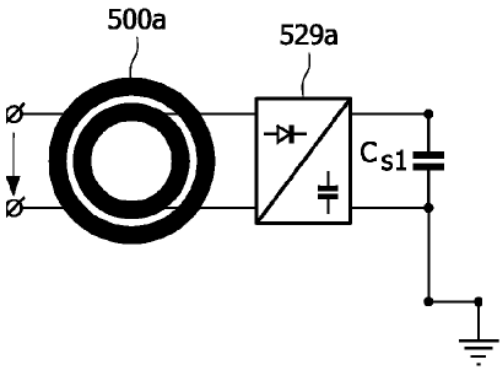
In other words, the DC voltage required to drive the load 530 is supplied by both rectifiers 529a and 529b. Consequently, the upper rectifier 529a supplying a voltage U_a to the anode, and in particular the output supplying the current I_a, is to be considered to correspond to the "positive output" and the lower rectifier 529b providing the voltage U_k, and in particular the output supplying the current I_k, is to be considered to correspond to the "negative output" within the meaning of claim 1.

In addition, in document O1, both rectifiers 529a and 529b are connected to a common ground electrode of the X-ray tube, see the description of document O1 in paragraph [0040], at the respective outputs of the rectifiers opposite the "positive output" and the "negative output". The findings of the opposition division to that effect in the contested decision are thus correct.

From the above assessment of what is the "positive output" and what is the "negative output" in the power transfer circuit of document O1, it follows that feature 1.6 of claim 1 is not disclosed in document O1, because neither the positive output nor the negative output of the entire power transfer circuit for driving the X-ray tube 530 is connected in this sense to a secondary ground on the rotating part. The

corresponding findings of the opposition division in the contested decision are thus correct (see point 3.3, first paragraph of the reasons for the contested decision).

2.5 With regard to the appellant's other arguments, it may be true that two outputs are inherent in a rectifier and it does not really matter what you call them. It is also clear that a DC voltage is provided at these outputs, which is also an inherent function of a rectifier. At the oral proceedings, the appellant presented a carefully prepared modified figure 9 to show that all the features of claim 1 can be found in figure 9. The corresponding modified figure 9 is reproduced below:



2.6 The above extract from figure 9, when considered in isolation, may indeed disclose at least features 1.1 to 1.6 of claim 1. However, there can be no doubt that the extract is based on hindsight. In particular, it does not correspond to an independent teaching which the skilled person, without knowledge of the invention, would derive from the inductive power transfer circuit shown in figure 9. In particular, as stated several times in the above reasons, the skilled person would not understand the upper rectifier 529a, although independently controllable, to provide the positive

output and the negative output of an independently working inductive power transfer circuit within the meaning of claim 1. Rather, looking at figure 9 as a whole, it is clear that the single independent rectifier 529a cannot drive the load and, in particular, its two outputs alone cannot provide the DC voltage required to operate the X-ray tube.

2.7 In summary, in the present assessment of the novelty of the subject-matter of claim 1, the board has first considered what the person skilled in the art would understand from the wording of claim 1. On the basis of the corresponding skilled person's understanding of claim 1, the board has then considered whether the skilled person would recognise a similar teaching to be disclosed in figure 9, in particular in combination with paragraphs [0004] and [0040] of document O1. The subsequent comparison between what is actually covered by claim 1 and what the skilled person would consider to be disclosed in document O1 has shown that there is no correspondence with respect to feature 1.6.

2.8 Therefore, the board has arrived at the conclusion that the ground for opposition under Article 100(a) EPC in combination with Article 54 EPC does not prejudice the maintenance of the patent. This conclusion is also valid if one takes into account document O15, the admissibility of which could thus be left open.

2.9 For the sake of completeness, the board notes that the same standards and, in particular, the same skills of the person skilled in the art were of course applied in the assessments of the grounds of opposition under Article 100(b) EPC and Article 100(a) EPC in combination with Article 54 EPC. The assessments in both cases are therefore consistent in terms of how the

person skilled in the field of inductive power transfer systems would understand the teachings in question.

3. Ground for opposition under Article 100(a) EPC in combination with Article 56 EPC

3.1 The only objection raised by the appellant in the appeal proceedings under Article 100(a) EPC in combination with Article 56 EPC was that the subject-matter of claim 1 of the patent as granted did not involve an inventive step in view of a combination of documents O1 and O7/O16.

3.2 In the above assessment of the ground for opposition under Article 100(a) EPC in combination with Article 54 EPC, the board concluded that document O1 does not disclose at least feature 1.6 of claim 1 of the patent as granted.

3.3 The objective technical problem, when starting from 01 and in view of the distinguishing feature 1.6 is considered to be that of how to increase the safety of the inductive power transfer circuit.

3.4 Document O7 and the corresponding family member O16 disclose feature 1.7 of claim 1, namely the coupling of a secondary ground (i.e. the "rotatable gantry section") via a galvanic contact to a protective earth on the primary side of the inductive rotating coupler, see in particular paragraph [0004] of document O7.

3.5 However, the combination of documents O7/O16 with document O1 does not render the subject-matter of claim 1 obvious, because none of these documents disclose or suggest feature 1.6 of claim 1, i.e. a connection of one of the positive output or the negative output (in

the sense of feature 1.5) to a secondary ground at the rotating part.

3.6 Thus, as the opposition division correctly found in the contested decision, even if the skilled person had combined the teachings of document O1 with that of document O7, this would not have resulted in the subject-matter of claim 1 (see point 4.1.4 of the reasons for the contested decision). The same conclusion applies to a combination of document O1 with O16, the admissibility of which could therefore be left open in the appeal proceedings.

3.7 In the appeal proceedings, the appellant did not present any arguments with respect to the obviousness of feature 1.6 in view of a combination of documents O1 and O7/O16. They relied instead on their understanding that this feature was disclosed in document O1, with which the board does not agree, as already discussed in detail above in the context of novelty.

3.8 Therefore, in the absence of any arguments to the contrary, the board concluded that the ground for opposition under Article l00(a) EPC in combination with Article 56 EPC does not prejudice the maintenance of the patent as granted.

4. Conclusion

Since none of the grounds for opposition under Article 100(b) EPC and Article 100(a) EPC in combination with Articles 54 and 56 EPC prejudices the maintenance of the patent as granted, the board had to accede to the respondent's main request.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

U. Bultmann R. Lord

Decision electronically authenticated