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Datasheet for the decision of 18 August 2020

Case Number: T 0178/16 - 3.5.02

Application Number: 04724628.5

Publication Number: 1509990

IPC: H02M7/5387, H02M1/32

Language of the proceedings: EN

Title of invention:
Configuration and Method for Protecting Converter Means

Patent Proprietor:
ABB Oy

Opponents:
GE Energy Power Conversion Technology Ltd /
GE Energy Power Conversion UK Ltd

Relevant legal provisions:
EPC Art. 100(b), 100(a), 56
RPBA Art. 12(4)

Keyword:
Grounds for opposition - late-filed ground for opposition (not admitted) - discretion of Opposition Division not to admit was correctly exercised
Inventive step - (yes)

Decisions cited:
G 0010/91, G 0007/95, T 1286/14, T 1298/15, T 0620/08, T 0986/93, T 0021/15, T 0500/91

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Case Number: T 0178/16 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 18 August 2020

Appellants: (Opponents)	GE Energy Power Conversion Technology Ltd / GE Energy Power Conversion UK Ltd Boughton Road Rugby Warwickshire CV21 1BU (GB)
Representative:	Serjeants LLP Dock 75 Exploration Drive Leicester, LE4 5NU (GB)
Respondent: (Patent Proprietor)	ABB Oy Strömbergintie 1 00380 Helsinki (FI)
Representative:	Kolster Oy Ab (Salmisaarenaukio 1) P.O. Box 204 00181 Helsinki (FI)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 1 December 2015 rejecting the opposition filed against European patent No. 1509990 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	R. Lord
Members:	F. Giesen
	R. Cramer

Summary of Facts and Submissions

I. This appeal by the opponents lies from the decision of the Opposition Division of the European Patent Office posted on 1 December 2015 rejecting the opposition filed against European patent No. 1509990 pursuant to Article 101(2) EPC.

II. The appellants (opponents) requested in writing that the decision of the Opposition Division be set aside and that the patent be revoked because the grounds for opposition under Article 100(b) and 100(a) with 56 EPC prejudiced the maintenance of the patent.

The ground under Article 100(a) and 56 EPC was based on the documents:

D1: DE 197 35 742 A1

D2: Newman M.J. et al: "An Integrated Approach for the Protection of Series Injection Inverters", IEEE Transactions on Industry Applications, Vol. 38, No. 3, May/June 2002, pp. 679 to 687.

The respondent (patent proprietor) requested in writing that the appeal be dismissed.

III. After the Board informed the parties in a communication pursuant to Article 15(1) RPBA of their preliminary opinion, the respondent and the appellants withdrew their requests for oral proceedings with letters dated 3 and 4 August 2020, respectively. The oral proceedings were consequently cancelled.

IV. Claim 1 of the sole request reads as follows:

"A protection configuration for converter means (INU), the protection configuration being adapted to protect a rotor circuit of a double-fed slip-ring generator (1), the rotor circuit having converter means which are provided with a direct voltage side coupled to a direct voltage intermediate circuit (3), and an alternating voltage side, and which converter means (INU) comprise means for inverting the direct voltage of the direct voltage intermediate circuit (3) and for feeding it to the alternating voltage side, the inverting means comprising a plurality of controllable switches (V1 to V6), the protection configuration comprising a protection circuit (2) and control means, the protection circuit (2) being coupled to the alternating voltage side of the converter means (INU) and comprising at least one protective switch (V11) adapted to short-circuit the alternating voltage side of the converter means (INU), wherein the control means is adapted to close the protective switch (V11) in predetermined failure situations and thus to short-circuit the alternating voltage side of the converter means (INU), characterized in that the control means are adapted in the predetermined failure situations to open the plurality of controllable switches (V1 to V6) of the inverter means of the converter means (INU) in connection with closing the protective switch (V11) and to leave the plurality of controllable switches (V1 to V6) open until the failure situation is over, and the control means is adapted to short-circuit the alternating voltage side of the converter means (INU) after the failure

situation is over by means of the plurality of controllable switches (V2, V4, V6) to enhance commutation of the protective switch (V11)."

Claim 7 of the sole request was an independent claim directed to a corresponding method, the wording of which does not need to be reproduced here (see point 4.6 below).

V. The appellants' arguments which were relevant for the present decision can be summarised as follows:

The ground for opposition pursuant to Article 100(b) EPC should have been considered by the Opposition Division and should be considered by the Board. While it was true that the objection of insufficiency of disclosure was not part of the original statement of opposition, it was a direct response to technical submissions made by the patent proprietor filed in accordance with Rule 116 EPC, and the decision of the Opposition Division that the ground for opposition was not *prima facie* relevant was incorrect. The Opposition Division therefore made a clear and obvious error in not fully considering this ground for opposition and in finding the patent valid. The characterising portion of claim 1 defined the invention functionally. A functional claim was only acceptable if all alternatives falling within the functional definition were available and achieved the desired result. Operating the unmodified apparatus of D1 according to the teaching of D2 would achieve the desired result. However, as evidenced by the patent proprietor's submissions in the opposition proceedings, operating the unmodified apparatus of D1 in this manner would not be available to the skilled person from the teaching of

the opposed patent, which consequently did not sufficiently disclose the invention of claim 1.

The ground for opposition pursuant to Article 100(a) EPC prejudiced the maintenance of the opposed patent because the subject-matter of granted claim 1 did not involve an inventive step in view of D1 and D2. D1 disclosed a protection configuration having all the structural features of claim 1. The only distinguishing feature was the purely functional definition of how the switches were operated in case of a failure. The protection configuration could be operated in the manner claimed, contrary to the respondent's model calculations. The skilled person would have consulted D2 in order to solve the problem of enhancing commutation after a grid fault. Both documents contained more generally power converters, which had very similar grid fault protection requirements. A skilled person would not have restricted a search to a solution to the extremely narrow field of doubly-fed induction generators of D1. The solution according to D2 could be applied to the apparatus of D1. The respective calculations of the respondent did not take into account the frequency spectrum of typical currents in a doubly-fed slip ring generator. Given the typical situation that the slip frequency was small, zero crossings of the current in the protection circuit would occur quickly, thus bringing the current through the protective switch below the holding current. D2 suggested precisely the functional operation of the switches as claimed.

VI. The respondent's arguments which were relevant for the present decision can be summarised as follows:

The ground for opposition pursuant to Article 100(b) EPC was a fresh ground for opposition because the appellants attempted for the first time to have it introduced into the procedure during the oral proceedings before the Opposition Division. The Opposition Division correctly exercised their discretion not to admit this ground because it was *prima facie* not relevant. The length of the appellants' submissions demonstrated that the submission was not *prima facie* relevant. In addition the submission was not relevant as to its substance. The proprietor did not give the required approval for introduction of this fresh ground for opposition. Hence it could not be examined at the appeal stage.

The protection configuration of claim 1 involved an inventive step in view of D1 and D2. The protection configuration according to D1 could not be operated so as to bring the current in the protective circuit below the holding current. Given that the components of D1 would be chosen within the context of that document, it was not true that the only distinguishing feature was the way the inverter switches were operated. A skilled person would not have consulted D2, which was in a different field. Short-circuits in the secondary transformer winding of D2 could be sustained for a long time, contrary to the situation in a doubly-fed generator. High currents in the rotor windings of a doubly-fed generator would seriously affect operation and cause overheating. The solution of D2 could not be applied to the apparatus of D1. The resultant solution was of no practical use as it would take longer than acceptable for the triacs to turn off, because this required zero-crossings of the secondary transformer side phase currents.

Reasons for the Decision

1. Admissibility of the Appeal

The appeal was filed in due time and form. It is therefore admissible.

2. Decision in the Written Procedure

The present decision can be handed down in the written procedure. It was no longer necessary to hold oral proceedings, since in response to the Board's communication pursuant to Article 15(1) RPBA 2020 both parties withdrew their respective requests and did not provide any further submissions. Furthermore, this decision is only based on grounds presented with the statement of grounds of appeal, the reply to the statement of grounds and the preliminary opinion of the Board, on which both parties consequently had an opportunity to comment.

3. Admittance of the Ground for Opposition Pursuant to Article 100(b) EPC

3.1 The Board does not admit the ground for opposition pursuant to Article 100(b) EPC pursuant to Article 12(4) RPBA 2007, which is applicable by virtue of Article 25(2) RPBA 2020.

3.2 The ground for opposition under Article 100(b) EPC (sufficiency of disclosure) was not raised by the then opponents, now appellants, within the nine month period pursuant to Article 99 EPC and was not substantiated in the statement of grounds for opposition pursuant to

Rule 76(2)(c) EPC. The Opposition Division considered they had a discretion not to consider this ground because it was not submitted in due time and not *prima facie* relevant. The appellants state that the Opposition Division should have admitted the objection and in the statement of grounds of appeal request that the Board consider the ground for opposition under Article 100(b) EPC.

3.3 According to decision G 10/91 (OJ EPO 1993, 420) headnote 3, fresh grounds for opposition may be considered in appeal proceedings only with the approval of the patent proprietor. According to G 7/95 (OJ EPO 1996, 626), reasons 5.3, the term "a fresh ground for opposition" which is used in paragraph 18 of G 10/91, must be interpreted as having been intended to refer to a new legal basis for objecting to the maintenance of the patent, which was not both raised and substantiated in the notice of opposition, and which was not introduced into the proceedings by the Opposition Division in accordance with the principles set out in paragraph 16 of G 10/91, see also decisions T 1286/14, reasons 1.2 and T 1298/15, reasons 1.1 to 1.2. The Boards in decisions T 0620/08, reasons 3.1 to 3.4 and T 0986/93 (OJ EPO 1996, 215), reasons 2.1 to 2.5 considered the term "fresh ground" somewhat differently as a ground which is relied upon for the first time in appeal proceedings. A Board of Appeal was at least not barred from considering a ground for opposition not raised and substantiated within the nine month period but relied upon later during the opposition proceedings even without the consent of the patent proprietor if they were of the opinion that the Opposition Division had exercised their discretion in this respect wrongly.

Even if a Board of Appeal is not barred from considering a ground for opposition not considered by the Opposition Division, they have the power to hold inadmissible facts, evidence or requests, which were not admitted in the first instance proceedings pursuant to Article 12(4) RPBA 2007, which applies pursuant to Article 25(2) RPBA 2020. The Board considers this to be in line with decision T 0021/15, reasons 1.1. to 1.7.

3.4 The Opposition Division did not exercise their discretionary power erroneously.

The parties do not contest that the ground for opposition was late filed. According to Article 114(2) EPC and G 10/91, the Opposition Division had a discretionary power not to consider this ground for opposition. As explained in G 10/91 and in further detail in T 1298/15, *loc. cit.*, the main criterion on which the discretionary decision is to be based is *prima facie* relevance. This is the criterion used by the Opposition Division in the present case. The Board observes that the statement of grounds of appeal does not contain any explanation as to why the Opposition Division exercised their discretion in a legally incorrect or unreasonable way, but instead only argues to the effect that the conclusion of the Opposition Division concerning the substance was not justified.

3.5 The question whether or not the ground for opposition pursuant to Article 100(b) EPC is considered a fresh ground which can only be considered with the patent proprietor's approval does not, under the present circumstances, have to be decided, because the Board holds it inadmissible pursuant to Article 12(4) RPBA 2007.

Article 12(4) RPBA 2007 vests the power in a Board of Appeal not to consider, *inter alia*, facts and requests which which could have been presented or were not admitted in the first instance proceedings.

Firstly, the ground for opposition was - correctly, as argued in section 3.4 above - not admitted by the Opposition Division into the first instance proceedings. Hence, the Board does not see any justification for considering it in the appeal proceedings. Secondly, the the technical submissions made by the patent proprietor during the first instance opposition proceedings cannot serve as a justification for the admission of the late filed ground for opposition pursuant to Article 100(b) EPC. These submissions do not include any surprising fact or view which would have put the appellants in the position to raise the objection of lack of sufficiency of the disclosure for the first time in the letter dated 21 September 2015. Rather, they referred to the claim as granted and to document D1, which were both known to the appellants before the lapse of the nine month opposition period. The appellants appear to argue that because the submissions of the respondent incited them to raise the ground under Article 100(b) EPC, the late filing was justified. Rather, the appellants could have been expected to raise this ground within the nine month opposition period because all the facts and evidence were already known to them at that time.

4. Inventive Step - Articles 100(a) and 56 EPC

4.1 The subject-matter of claim 1 involves an inventive step within the meaning of Article 56 EPC because it is

not obvious in view of the state of the art of D1 and D2.

4.2 Closest Prior Art

The Board is satisfied that D1 is a suitable starting point for assessing inventive step. The respondent has argued that the apparatus of D1 could not be operated in the manner prescribed by the claim, which would make it an unsuitable choice. The Board does not find this argument persuasive for the reasons set out below.

4.3 Distinguishing Features

D1 discloses a protection arrangement according to the preamble of claim 1 of the opposed patent.

The Board is not convinced by the respondent's argument that in the context of D1 a skilled person would select components which would not enable a successful commutation of the protection devices even if the protection configuration were controlled as required by claim 1. Claim 1 is not limited to any particular type of switch, either as part of the converter means or as regards the protective switch. The respondent's argument is based on too restrictive a reading of the desired technical effect of "enhancing commutation". In the respondent's view this had to be understood as "bringing the current through the protective switch below the holding current". However, there is no basis for such a restrictive reading given the broad wording of the claim (see also the discussion below concerning the technical effect).

Both the protection configuration of D1 and that of claim 1 are in the field of doubly-fed induction

generator crowbars. The Board therefore can not recognise any teaching in the opposed patent or D1 which would imply qualitatively different switches or other components. Therefore, there do not appear to be any further distinguishing features beyond those of the characterising portion of the claim, *viz.*

> *that the control means are adapted in the predetermined failure situations to open the plurality of controllable switches (V1 to V6) of the inverter means of the converter means (INU) in connection with closing the protective switch (V11) and to leave the plurality of controllable switches (V1 to V6) open until the failure situation is over, and the control means is adapted to short-circuit the alternating voltage side of the converter means (INU) after the failure situation is over by means of the plurality of controllable switches (V2, V4, V6) to enhance commutation of the protective switch (V11).*

4.4 Technical Effect and Objective Technical Problem

Claim 1 itself specifies the technical effect achieved to be the enhancement of commutation of the protective switch. The expression "enhance" does not have a precise technical meaning in the present circumstances.

According to column 2, lines 2 to 14 of the opposed patent a protective circuit implemented by a thyristor does not commutate reliably. Indeed, it is part of the general knowledge of a skilled person that thyristors are not fully controllable power switches. When a thyristor turns on it latches and cannot be turned off until the current falls below the holding current. In the context of a thyristor, it is thus apparent to a

skilled person that diverting current away from the protective switch by short-circuiting some of the inverter switches (e.g. V2, V4 and V6) will bring the current closer to the holding current and thus to enhance commutation to some degree. However, the expression "enhance commutation" does not mean that commutation is rendered possible exclusively by closing the inverter switches, or in other words that closing the inverter switches brought the current in the protective circuit necessarily below the holding current of a thyristor.

Furthermore, claim 1 is not restricted to the protective switch being a thyristor. Rather, the opposed patent specifically discloses in column 5, lines 15 to 16 that the protective switch can be implemented using IGBTs (insulated-gate bipolar transistors) or GTOs (gate turn-off thyristors). This makes it even less clear what "enhancing commutation" means, since both types of switches can be turned off at any current in the protective circuit.

Since the objective technical problem must be formulated such that it is credibly solved across the entire scope of the claim, i.e. also in the case of IGBT and GTO switches, the Board is of the opinion that "enhancing commutation" is a suitable formulation but that its very broad and unspecific meaning has to be borne in mind.

4.5 Assessment of the Solution

4.5.1 The Board found neither party's arguments concerning the question whether a skilled person would have consulted D2 compelling. However, the following

analysis of inventive step assumes for the sake of argument that they would have done so.

4.5.2 Claims 1 and 7 define that the control means are adapted in the predetermined failure situations to open the plurality of controllable switches of the inverter means of the converter means in connection with closing the protective switch.

To the contrary, D2 teaches to force the inverter means to a NULL state, in which according to Figure 2(b) of D2 two switches of the inverter are open and two closed. The reason for doing this is that the IGBTs used as controllable inverter switches in D2 are fast switches. In the case of a fault the NULL state short-circuits the secondary sides of the series injection transformer and thus prevents an overvoltage condition in the inverter stage, see point III.A. on page 680 of D2.

This would mean that a skilled person would have to recognise that the proposed protection mechanism would have to be modified to arrive at the claimed subject-matter. According to D2, page 683, left column, third paragraph, the purpose of the NULL state is that it can be reached faster than latching of the triacs and thus helps ensure a current path at all times during a fault. The passage on page 683, right column, first paragraph explains that the NULL state is kept until the triacs have turned off. Neither passage explains that putting the inverter in the NULL state aids in unlatching the triacs. The skilled person would therefore understand the teaching of D2 such that the technical effect of the NULL state after a fault is also to ensure a current path at all times while the triacs turn off.

The enhancement of commutating the triacs - in the broad sense defined above - might be a bonus effect that is also achieved in D2, simply by the fact that current is diverted from the triacs to the inverter IGBT. However, D2 is entirely silent on this effect. There is no disclosure to the skilled person that diverting the current is in any way desirable from a point of view of commutating the triacs.

Therefore, even assuming that a skilled person would have consulted D2, they would have had to modify the teaching of D2 such as to skip the NULL state on turning on the protection circuit but - without any explicit suggestion or hint of the desired bonus effect - not skip the NULL state during turning off of the protection circuit.

This would amount to selecting only certain aspects of the teaching of D2 in isolation without any clear hint to do so.

4.5.3 The Board does not consider the discussion of decision T 500/91, adduced by the appellants and the Opposition Division, to be helpful for deciding the present case, since that decision concerns a case that has little in common with the present one, which can be decided without detailed considerations of what a skilled person would or would not do as part of his routine activity.

4.5.4 Given the above reasoning, the parties' arguments as to whether D1 could be modified at all to work in the claimed way, whether the skilled person would have consulted D2 at all and whether the solution according to D2 would have any practical purpose do not have to

be discussed in detail. Even answering all these questions in the affirmative would still not support the appellants' case sufficiently.

Given that the opposition was rejected, the burden of demonstrating that a ground for opposition (here inventive step) prejudices the maintenance of the patent lies still with the appellants-opponents. The Board after considering all arguments finds that there remain at least doubts whether a skilled person would have consulted D2 and even stronger doubts that D2 contained any clear suggestion that the NULL state was beneficial for commutation of the protective switch. Given this considerable doubt, which the appellants were not able to dispel, the Board comes to the conclusion that the subject-matter of claim 1 is not rendered obvious by D1 and D2.

4.6 The appellants did not argue that the subject-matter of claim 7 did not involve an inventive step. Nonetheless, for the sake of completeness the Board wishes to add in this respect that it considers that the argument concerning claim 1 applies analogously to claim 7.

5. Conclusion

Since the ground for opposition pursuant to Article 100(b) EPC was not admitted by the Board and since the ground pursuant to Article 100(a) EPC in combination with Article 56 EPC does not prejudice the maintenance of the opposed patent, the Board accedes to the respondent's request.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

U. Bultmann R. Lord

Decision electronically authenticated