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**Datasheet for the decision
of 15 October 2021**

Case Number: T 0678/20 - 3.5.02

Application Number: 15160896.5

Publication Number: 2930839

IPC: H02M7/48

Language of the proceedings: EN

Title of invention:
Multi-level inverter

Patent Proprietor:
Solaredge Technologies Ltd.

Opponents:
Huawei Technologies Duesseldorf GmbH
Wattkraft Solar GmbH

Relevant legal provisions:
EPC Art. 83
RPBA 2020 Art. 13(2)

Keyword:
Sufficiency of disclosure - main request (no)
Amendment after summons - exceptional circumstances (no)



Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 0678/20 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 15 October 2021

Appellant: Solaredge Technologies Ltd.
(Patent Proprietor) 6 HeHarash St.
POB 7349
45240 Hod Hasharon (IL)

Representative: Schmid, Andreas
Hogan Lovells International LLP
Karl-Scharnagl-Ring 5
80539 München (DE)

Respondent: Huawei Technologies Duesseldorf GmbH
(Opponent 1) Hansaallee 205
40549 Düsseldorf (DE)

Respondent: Wattkraft Solar GmbH
(Opponent 2) Podbielski Str. 70
30177 Hannover (DE)

Representative: Emmerling, Friedrich
Braun-Dullaesus Pannen Emmerling
Patent- und Rechtsanwaltspartnerschaft mbB
Postfach 33 06 80
80066 München (DE)

Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 9 January 2020
revoking European patent No. 2930839 pursuant to
Article 101(3) (b) EPC.**

Composition of the Board:

Chairman R. Lord
Members: H. Bronold
 W. Ungler

Summary of Facts and Submissions

- I. The appeal of the patent proprietor is against the decision of the opposition division to revoke European patent No. 2 930 839. The opposition division concluded that the opposition ground under Article 100(b) EPC prejudiced the maintenance of the patent as granted.
- II. In a communication under Article 15(1) RPBA the board informed the parties that it tended to agree with the respondents that auxiliary request 2 filed with the statement of grounds of appeal did not fulfil the requirement of Article 83 EPC for the same reasons as for the then pending main request. The reason for this was *inter alia* that in claim 1 the interphase balancing block was not defined to be connected to the the outer capacitors, although all embodiments of the patent seemed to include such outer capacitors.
- III. Oral proceedings before the board were held on 15 October 2021.
- IV. The appellant (patent proprietor) requested that the decision under appeal be set aside and that the patent be maintained on the basis of auxiliary request 2 filed with the statement of grounds of appeal (main request), auxiliarily that the patent be maintained on the basis of one of auxiliary requests 2a and 2b filed with letter dated 16 August 2021 and auxiliary requests 2c and 3b filed during the oral proceedings of 15 October 2021.

V. The respondents (commonly represented opponents 1 and 2) requested that the appeal be dismissed.

VI. Claim 1 according to the main request reads as follows:

"An apparatus comprising a single-phase multi-level inverter comprising

- a first phase circuit (T14B-D, T15B-D, C43-C44), and
- a second phase circuit (T16B-D, T17B-D, C43-C44),

each of the first and the second phase circuits comprising a flying capacitor circuit having a first bank (T14B-D) and a second bank (T15B-D) of series connected switches and a plurality of capacitors (C43-C44), wherein

the first bank and the second bank are connected in series, and

the plurality of capacitors are each connected between one of the series connected switches in the first bank and a corresponding one of the series connected switches in the second bank;

- a first set of switches (T14A, T15A) connecting the first phase circuit between voltage input terminals (Vdc+, Vdc-) and;

- a second set of switches (T16A, T17A) connecting the second phase circuit between the voltage input terminals; and

- an interphase balancing circuit (B1) comprising a first pair of terminals connected in parallel across the first phase circuit and a second pair of terminals connected in parallel across the second phase circuit, wherein the interphase balancing block removes ripple voltage across the first phase circuit and across the second phase circuit by sharing current between the first phase circuit and second phase circuit, wherein the interphase balancing circuit comprises:

- a first switch (T18) connecting a high input terminal of the first phase circuit to a low input terminal of the second phase circuit; and
- a second switch (T19) connecting a high input terminal of the second phase circuit to a low input terminal of the first phase circuit; and
- the apparatus further comprising a controller, wherein
 - the first set of switches comprises at least one high switch (T14A) connecting a first input terminal of the first phase circuit to a first one (Vdc+) of the voltage input terminals and [sic] least one low switch (T15A) connecting a second input terminal of the first phase circuit to a second one (Vdc-) of the voltage input terminal [sic];
 - the second set of switches comprises at least one second high switch (T16A) connecting a first input terminal of the second phase circuit to the first one (Vdc+) of the voltage input terminals and [sic] least one second low switch (T17A) connecting a second input terminal of the second phase circuit to the second one (Vdc-) of the voltage input terminals; and
 - the controller is configured to switch the first set of switches and the second set of switches at a lower frequency than the switches in the first and second phase circuits, wherein
 - the controller is further configured to
 - switch the first switch (T18) such that the first switch (T18) follows the at least one low switch (T15A) of the first set of switches;
 - switch the second switch (T19) complementary to the first switch (T18) such that the second switch (T19) follows the at least one high switch (T14A) of the first set of switches."

- VII. Auxiliary requests 2a, 2b, 2c and 3b are not cited here in view of the boards decision to exercise its discretion under Article 13(2) RPBA not to take them into account in the proceedings.
- VIII. The appellant's arguments, as far as they are relevant for this decision, can be summarised as follows:

Main request

The invention claimed in claim 1 according to the main request was sufficiently disclosed. The outer capacitors C42 were not required for the functioning of the claimed circuit. The appellant had shown with simulation results during the first instance proceedings that the invention could be carried out even with very small outer capacitors. Further, the appellant had successfully simulated the claimed circuit without outer capacitors. The actual product merely comprised outer capacitors of very small capacity. The issue of insufficient disclosure was thus a discussion about technical facts, not about the disclosure in the patent. The respondents had however filed no evidence that the claimed circuit did not work without outer capacitors. Moreover, the patent even contained disclosure for a circuit without outer capacitors. According to paragraph [104] of the originally filed specification the outer capacitors C42 were described as optional due to the use of the word "may". Figure 35 together with paragraph [137] of the originally filed application disclosed that there were alternatives to the outer capacitors C87 and C88 in capacitors C89 to C91. It followed that the outer capacitor C42 was not essential as such.

The respondents' argument that ripple was caused in the outer capacitor also indicated that an outer capacitor was already implicit in claim 1 because otherwise, no ripple could occur. Further, claim 1 explicitly referred to the removal of ripple. Thus an outer capacitor was implicit in claim 1. This view corresponded to sections 4.4 and 4.6 of the preliminary opinion of the opposition division which were contained almost identically in the contested decision as sections 6.2.4 and 6.2.6. It had thus not been possible for the appellant to add an outer capacitor to claim 1 since it was already implicitly contained in that claim. According to the Guidelines for examination section F.IV-4.5.4 implicit features did not need to be included in a claim. A similar view was represented in the Case Law of the boards of appeal in section II.E. 1.3.3 referring to decision T917/94.

Auxiliary requests

There were special circumstances in the sense of Article 13(2) RPBA justifying taking auxiliary requests 2a, 2b, 2c and 3b into account.

Firstly, the objection regarding the broadness of claim 1 had been raised by the opposition division in its preliminary opinion, not by the opponent. However, the opposition division had considered the outer capacitor as implicitly contained in claim 1. Under these circumstances filing an amended claim including the outer capacitor could have led to inadmissibility of such a request because the outer capacitor would then have been claimed redundantly. In consequence, the proprietor had been prevented from filing a corresponding request during the first instance proceedings. The board's communication under Article

15(1) RPBA formed the first reasonable point in time to react to the objection of missing outer capacitors.

Secondly, in the appeal proceedings, the appellant had concentrated on the aspects where they had lost before the opposition division and filed a plurality of different requests in order to overcome the corresponding objections. One month after the newly appointed representative had taken over the case, the appellant had filed auxiliary requests including the outer capacitor. According to decision T1790/17 if amendments resulting from discussions were not possible, oral proceedings would be pointless. The present case was comparable to the one in T1790/17 such that auxiliary requests 2a, 2b, 2c and 3b should be taken into account.

IX. The respondents' arguments, as far as they are relevant for this decision, can be summarised as follows:

Main request

The description contained no disclosure how to remove ripple without an outer capacitor. Ripple was caused by or occurred in the outer capacitors. The ripple that was allegedly removed according to the patent was low frequency ripple. Such ripple could only occur in the outer capacitors. The word "may" was used in an inflationary manner throughout the patent and had to be interpreted as "must". Therefore, paragraph [104] of the originally filed description provided no basis for an apparatus without outer capacitors. Paragraph [137] of the description was not related to the claimed subject-matter. Moreover, this paragraph merely disclosed that capacitors C87 and C88 may be replaced by capacitors C89 to C91 which provided the same

function as capacitors C87 and C88. However, all switches represented in the corresponding figure 35 were fast-switching switches. Ripple in the sense of claim 1 could only occur between the slow-switching switches. Therefore, figure 35 and paragraph [137] also failed to disclose an alternative to the use of outer capacitors.

Auxiliary requests

The appellant had not argued that specific circumstances existed and also not justified them by cogent reasons. It was incorrect that the board's communication under Article 15(1) RPBA formed the first point in time where the objection of missing outer capacitors had been raised. The respondents had already raised that point in their reply to the appeal. The appellant had not reacted in time. The period for reacting to a reply to appeal was 2 months according to the commentary to the new RPBA. Even after the board had repeated the opponents' objection in its communication under Article 15(1) RPBA, the appellant had not reacted. A change in representation did not represent special circumstances in the sense of Article 13(2) RPBA. The appellant's argument that 2 months are enough to consider new requests before oral proceedings in appeal did not fulfil the requirements of Article 13(2) RPBA either. The appellant's auxiliary requests 2a, 2b, 2c and 3b were therefore not to be taken into account in the appeal proceedings.

Reasons for the Decision

1. Admissibility of the appeal

The appeal was filed in due time and form and sufficiently substantiated. Consequently, the appeal is admissible.

2. Main request - Article 83 EPC

2.1 Regarding the main request, the dispute between the parties related to the question whether the patent disclosed an embodiment without outer capacitors and whether outer capacitors (C42) connected to the interphase balancing circuit were obligatory in the independent claims or could be regarded as being implicit.

2.2 Regarding the first line of argument, the board has arrived at the conclusion that the patent does not describe in detail at least one way of carrying out the claimed invention, although this is mandatory according to Article 83 EPC, (see also Rule 42(1)(e) EPC). This requirement is independent of external considerations of technical feasibility. The board therefore does not agree with the appellant's corresponding argument, that the requirement of Article 83 EPC was not to be decided based on the patent, but was a purely technical question. To the contrary according to Rule 42(1)(e) EPC, it is the patent that needs to describe at least one way of carrying out the invention.

The board is not convinced that the patent discloses any embodiment that implements the removal of low frequency ripple and functions without a connection of the interphase balancing block to the outer capacitors C42 as disclosed in particular in paragraph [0059].

As argued by the respondents, all embodiments of the inverter according to the patent include outer capacitors, like capacitors C42 in case of the embodiment according to figure 14, to which the interphase balancing circuit is connected. Thus the invention is not sufficiently disclosed across the full scope of the claims.

In this context, the board is not convinced by the appellant's arguments. In particular, as correctly pointed out by the respondents, the word "may" is used in an inflationary manner throughout the patent. Almost all conjunctions in the description of the invention are "may" or relate thereto. Therefore, the board concurs with the respondents that it is justified to interpret the expression "may be" in the sentence "The inter-phase balancing block B1 may be connected in parallel to capacitor C42..." in paragraph [104] of the originally filed specification as "must be". Therefore, the board does not agree with the appellant that the outer capacitor is described as optional in paragraph [104] of the originally filed description.

The board further does not concur with the appellant that paragraph [137] of the originally filed description describes alternatives to the outer capacitors C42 which could justify omitting the same in the independent claims. According to paragraph [137]

"The three center capacitors C89-C91 may be used in addition to or in place of the two pairs of capacitors C87, C88...".

This statement does not convince the board that the corresponding capacitors may be omitted. Paragraph [137] together with figure 35 merely discloses that instead of outer capacitors C87, C88 connected in parallel to the interphase balancing circuit B6, corresponding capacitors may be included within the interphase balancing circuit of figure 35 as capacitors C89-C91.

Consequently, the board concludes that neither of the two paragraphs [104] and [137] of the originally filed description mentioned by the appellant discloses that the outer capacitors may be omitted.

Therefore, the patent does not describe in detail at least one way of carrying out the claimed invention, contrary to the requirement of Rule 42(1)(e) EPC.

2.3 Regarding the second line of argument, the board concludes that the corresponding feature of outer capacitors can not be regarded as implicit to the wording of claim 1 and would need to be explicitly included in claim 1 to fulfil the requirement of Article 83 EPC.

The appellant argued that implicit features do not have to be included in the wording of a claim in accordance with the Guidelines for Examination in the European Patent Office, section F.IV-4.5.4, or with the Case Law of the Boards of Appeal, section II.E.1.3.3 referring to decision T917/94.

The board notes that both examples cited by the appellant relate to features which can be unambiguously inferred from the features present in the claim of these examples. According to the example in the Guidelines, it is not necessary to mention in a claim that a bicycle has wheels. Decision T0917/94 on the other hand concerns a feature, namely the dependence of aqueous solubility of a filter dye upon the pH, which was already defined in the wording of a claim by other features, namely by the chemical formula, the pKa and the log p.

An implicit feature according to the cited passages of the Guidelines and the Case Law can therefore be understood as a feature that can be unambiguously inferred from feature(s) explicitly mentioned in the claim.

However, as explained below, the board considers the feature of the outer capacitors C42 not to be an implicit feature in the sense of the above mentioned examples. Whether an additional outer capacitor is implicit to the apparatus according to claim 1 or not may not be inferred from the features of the apparatus claimed in claim 1.

The feature with respect to which the outer capacitor was considered to be implicit by the appellant was the fact that the claimed apparatus is defined as removing ripple across the first phase circuit and across the second phase circuit. According to the appellant, the patent defines that low frequency ripple is removed, which ripple occurred in the outer capacitors. Therefore, the outer capacitors needed to be interpreted as forming part of the wording of claim 1 because otherwise it was not possible to remove ripple.

The board disagrees for several reasons. The features present in the claim do not contain any information about what other circuit elements might or might not be present in the apparatus to achieve the desired result of removal of ripple across the first and second phase circuits. Firstly, claim 1 does not define the frequency of the ripple to be removed. Therefore, it can not be assumed that it can only be low-frequency ripple that is to be removed, and as a consequence it cannot be inferred that the outer capacitors, which according to the patent are crucial to the generation of such low frequency ripple, are present in the claimed apparatus. Secondly, the wording of claim 1 explicitly defines that ripple is removed by the interphase balancing block, which according to claim 1 is defined as comprising two switches connected across the first and second phase circuits. Nothing in this feature hints towards the implicit presence of outer capacitors. Thirdly, the appellant's arguments are over-all self-contradictory. On the one hand they argue that the apparatus works adequately even without the outer capacitors. On the other hand the outer capacitors are allegedly to be interpreted as being implicit in the claimed apparatus, i.e. mandatory.

In summary, the appellant's arguments regarding sufficiency of disclosure under Article 83 EPC did not convince the board.

Consequently, since the independent claims of the main request do not include features directed to a connection of the interphase balancing block to the outer capacitors and since the patent does not include disclosure of an embodiment, or indeed any other form of enabling disclosure, without such outer capacitors,

the board agrees with the respondents that claim 1 according to the main request does not fulfil the requirement of Article 83 EPC.

3. Auxiliary requests 2a, 2b, 2c, 3b - Article 13(2) RPBA

3.1 Auxiliary requests 2a and 2b were filed with letter dated 16 August 2021. Auxiliary requests 2c and 3b were filed during the oral proceedings before the board. The summons to oral proceedings before the board were notified on 23 December 2020. Thus, auxiliary requests 2a, 2b, 2c and 3b represent amendments in the sense of Article 13(2) RPBA.

According to Article 13(2) RPBA, any amendment to a party's appeal case made after notification of a summons to oral proceedings shall, in principle, not be taken into account unless there are exceptional circumstances, which have been justified with cogent reasons by the party concerned.

3.2 The appellant considered such exceptional circumstances to lie in the chronology of the case. They argued essentially that the objection of insufficient disclosure had been introduced by the opposition division, not by the opponents, and that they had been prevented from filing a request including the feature of the outer capacitors in the first instance because the opposition division regarded the outer capacitors as being implicitly claimed. Therefore, the addition of a feature for the outer capacitors might have been considered inadmissible by the opposition division.

The board is not convinced by these arguments. Whether an objection is raised by the opposition division or by

an opponent is irrelevant for the admissibility of requests filed during the appeal procedure. The opposition division has the power to introduce new objections. Further, nothing would have stopped the appellant at least filing a corresponding request including the disputed feature. Considering the fact that none of the appellant's requests pending before the opposition division was allowed during the respective oral proceedings, it is not apparent how a request including the disputed feature could have worsened the appellant's position.

- 3.3 Moreover, the appellant argued that they had filed a plurality of requests in the second instance, which all represented reactions to aspects of the contested decision decided against the appellant. From the decision there was also no need for the appellant to include the feature of the outer capacitors into the independent claims, because the opposition division had considered this feature as implicit in claim 1 according to then auxiliary request 2, which is now the main request.

This argument is not plausible for the board because the only amendment the appellant has made to their requests together with the statement setting out the grounds of appeal was in auxiliary request 3a. All the other requests were identical to those pending before the opposition division.

- 3.4 Lastly, the appellant argued that the first point in time where they could have filed a request including the feature of the outer capacitors was after the board's communication under Article 15(1) RPBA, in which respect the present case was comparable to the case decided in T1790/17 where an auxiliary request was

admitted under Article 13(2) RPBA following discussions during the oral proceedings.

The board disagrees. Firstly, it does not correspond to the facts underlying the case that the board's communication under Article 15(1) RPBA constitutes the first possibility for the appellant to react to the objection regarding the lack of the outer capacitors. The respondents had already argued accordingly in their reply to the statement of grounds of appeal. Secondly, the case decided in T1790/17 is not pertinent for the present decision mainly because it relates to *ex parte* proceedings and in particular because the chairman in case T1790/17 had given indications during the oral proceedings how the objections existing for the pending requests could be overcome.

Even if it were assumed that the board's communication under Article 15(1) RPBA represented the first possibility of the appellant to file corresponding amendments, the appellant should have done so in due time. Instead, they requested postponement of the oral proceedings and then filed the disputed auxiliary requests only with their letter dated 16 August 2021, i.e. approximately 8 months after the communication under Article 15(1) RPBA had been notified.

The fact that a change in representation on the side of the appellant had occurred does not represent exceptional circumstances in the sense of Article 13(2) RPBA either.

3.5 Consequently, the board has arrived at the conclusion that no exceptional circumstances have been justified with cogent reasons by the appellant. Hence the board has exercised its discretion under Article 13(2) RPBA

not to take auxiliary requests 2a, 2b, 2c and 3b into account in the appeal proceedings.

Conclusion

The board has arrived at the conclusion that the appellant's main request is not allowable. Further, the board has exercised its discretion not to take the appellant's auxiliary requests 2a, 2b, 2c and 3b into account in the proceedings. The board therefore accedes to the respondents' request.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



U. Bultmann

R. Lord

Decision electronically authenticated