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**Datasheet for the decision  
of 7 September 2021**

**Case Number:** T 0442/18 - 3.5.02

**Application Number:** 12712841.1

**Publication Number:** 2691968

**IPC:** H01H9/00

**Language of the proceedings:** EN

**Title of invention:**

Tap changer with an improved monitoring system

**Patent Proprietor:**

ABB Power Grids Switzerland AG

**Opponent:**

Maschinenfabrik Reinhausen GmbH

**Relevant legal provisions:**

EPC Art. 100(a), 56

RPBA 2020 Art. 13(2), 15(5)

**Keyword:**

Main request - Inventive step - (yes)

New line of attack after summons - exceptional circumstances  
(no)

Debate re-openend during oral proceedings (no)

**Decisions cited:**

G 0012/91, R 0010/08



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**Case Number: T 0442/18 - 3.5.02**

**D E C I S I O N**  
**of Technical Board of Appeal 3.5.02**  
**of 7 September 2021**

**Appellant:** Maschinenfabrik Reinhausen GmbH  
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**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 21 December  
2017 rejecting the opposition filed against  
European patent No. 2691968 pursuant to Article  
101(2) EPC.**

**Composition of the Board:**

**Chairman** G. Flyng  
**Members:** C.D. Vassoille  
A. Bacchin

## **Summary of Facts and Submissions**

- I. This is an appeal of the opponent against the decision of the opposition division to reject the opposition against European patent no. 2 691 968.
- II. The following documents are relevant for the present decision:
- D1: EP 0 667 009 B1  
D3: WO 01/92978 A1  
D4: EP 0 907 192 A2  
D12: US 2007/0057652 A1  
D22: Excerpt from text book by A. Krämer: "On-Load Tap-Changers for Power Transformers"
- III. In a communication annexed to the summons to oral proceedings according to Article 15(1) RPBA 2020, the Board informed the parties of their preliminary opinion according to which the subject-matter of claim 1 of the patent as granted appeared not to involve an inventive step (Articles 100(a) and 56 EPC).
- IV. With a letter of 13 July 2021 in reply to the Board's communication, the patent proprietor (respondent) filed amended claims according to auxiliary requests 1 to 6.
- V. Oral proceedings before the Board took place by videoconference on 7 September 2021 in the presence of both parties.
- VI. The opponent (appellant) requested that the decision under appeal be set aside and that the patent be revoked. Furthermore, the appellant requested that the

auxiliary requests submitted by the respondent be not admitted.

VII. The patent proprietor (respondent) requested that the appeal be dismissed (main request), auxiliarily that the decision under appeal be set aside and a patent be granted on the basis of the amended claims of one of the auxiliary requests 1 to 6 filed with letter of 13 July 2021. Furthermore, the respondent requested that the case be remitted to the opposition division should the Board consider that a multi-turn absolute encoder was disclosed in D1 and this would lead to revocation of the patent as granted.

VIII. Claim 1 of the respondent's main request (patent as granted) reads as follows (emphasis added by the Board):

"An on-load tap changer (10) for making tap changes in a transformer winding, the tap changer comprising:  
**(a.)** a tap change module connected to the transformer winding and comprising a bypass switch assembly (50), a vacuum interrupter assembly (50) [sic] and a selector switch assembly (48);  
**(b.)** a motor (124) connected to rotate at least one shaft (174, 122, 232), wherein the at least one shaft is connected to the tap change module and is operable upon rotation to cause the tap change module to perform a sequence of operations that effectuate a tap change, the operations comprising actuating the bypass switch assembly, actuating the vacuum interrupter assembly and actuating the selector switch assembly;  
**(c.)** a multi-turn absolute encoder (264) connected to the at least one shaft and operable to determine a position of the at least one shaft; and

(d.) a monitoring system (134) connected to the encoder to receive the position of the at least one shaft and operable to perform a method of monitoring a tap change, the method comprising determining from the position of the at least one shaft where the tap change module is in the sequence of operations."

Claims 2 to 15 are dependent on claim 1.

In view of the Board's decision on the main request, it is not necessary to reproduce auxiliary requests 1 to 6 here.

IX. The arguments of the appellant which are relevant for the present decision are as follows:

Document D1 disclosed feature (d.) of claim 1 according to which the monitoring system was operable to perform a method comprising determining from the position of the at least one shaft where the tap change module is in the sequence of operations. In particular, D1 in column 2, lines 15 to 20 disclosed *inter alia* that the tap changer had the great advantage that the information about its actual position within the range assigned to a tap position ("einer Stufenstellung zugeordneter Bereich") was transmitted to a controller. It was evident that the wording "range assigned to a tap position" referred to the sequence of operations in the sense of claim 1. It was also evident that in D1, by determining the angular position of the shaft 13 by means of the encoder 15, also the position of the tap change module in its sequence of operations could be determined. This was in line with the fact that the patent under appeal acknowledged in paragraph [0003] that document D1 disclosed feature (d.) of claim 1.

The only differences between the subject-matter of claim 1 of the patent under appeal and document D1 therefore were features (a.) and (b.) of claim 1, in particular as regards the specific elements of the tap change module, namely a bypass switch assembly, a vacuum interrupter assembly and a selector switch assembly, and causing these elements to be actuated in a sequence of operations to effectuate a tap change.

The distinguishing features could not be considered to involve an inventive step, because they pertained to the common general knowledge of the skilled person. Reference was made to the patent under appeal in paragraph [0003], lines 29 to 30 and lines 38 to 46, describing these features to be known in the art. Further reference was made to document D4 in paragraphs [0003], [0006], in particular lines 47 to 50, and [0010], as well as figure 7, disclosing corresponding elements of a tap change module as well as the switching sequence of these elements as defined in claim 1 of the patent under appeal.

Starting from document D1 as the closest prior art, the skilled person had to provide a suitable configuration and operation of the tap change module. The configuration and operation of the tap change module as defined in features (a.) and (b.) of claim 1 were well-known in the art and the skilled person would therefore obviously implement a corresponding configuration and operation in the on-load tap changer of document D1 to thereby arrive at the claimed invention. The subject-matter of claim 1 of the patent as granted consequently did not involve an inventive step within the meaning of Article 56 EPC.

A new objection based on document D1 in combination with document D4 and further with document D12 which the appellant sought to raise during the oral proceedings should be taken into account in the appeal procedure under Article 13(2) RPBA 2020. The respondent's argument focusing on an inventive step based on the distinguishing feature (d.) was not sufficiently substantiated in the reply to the appeal, but was rather presented by the response with reference to the precision of detecting the angular position of the shaft 13. The discussion of feature (d.) had therefore come as a surprise to the appellant.

A request during the oral proceedings that the debate on inventive step in view of document D1 in combination with the common general knowledge of the skilled person based on document D4 be re-opened, after it had previously been closed, was justified, because there was obviously a need to further explain the meaning of the actual position of the tap changer within the range assigned to a tap position ("einer Stufenstellung zugeordneter Bereich"), as disclosed in D1, column 2, lines 15 to 20.

- X. The arguments of the respondent which are relevant for the present decision are as follows:

The subject-matter of claim 1 not only differed in features (a.) to (c.) from document D1 but also in feature (d.). Claim 1 defined in feature (b.) a clear sequence of operations, which comprised actuating the bypass switch, actuating the vacuum interrupter assembly and actuating the selector switch assembly. Accordingly, feature (d.) specified the determination where the tap change module is in the sequence of operations by means of the position of the shaft.



Document D1, to the contrary, merely stated that the signal provided by encoder 15 was used to monitor the position of the input shaft 13 and to display the position of the tap changer to a user (see D1 in column 4, line 52 to column 5, line 1). From the mere tap position, however, i.e. from the position of the movable contact, no information could be derived regarding a status of the components of the tap change module that effectuated the tap change.

The passage in D1, column 2, lines 15 to 20 referred to by the appellant, did not disclose feature (d.) either. The respective passage referred to determining from the angular position of the shaft the actual position of the tap changer within the range assigned to a tap position ("einer Stufenstellung zugeordneter Bereich"). The actual position in the context of the disclosure of D1, however, did not correspond to the sequence of operations in the sense of claim 1. It rather referred to positions of the movable contacts within a specific tap position (see also D1 in column 2, lines 40 to 41). In any case, no conclusions could be drawn from this disclosure about the position of the tap changer in the sequence of operations.

The objective technical problem in view of the distinguishing feature (d.) of claim 1 could be considered to be that of how to increase the safety of the tap changer.

The solution to the objective technical problem was not obvious when starting from D1 as the closest prior art and in combination with the common general knowledge based on D4. D1 neither mentioned a sequence of operations nor determining from the position of the at

least one shaft where the tap change module is in the sequence of operations.

Document D4 did not provide a hint towards determining from the position of the at least one shaft where the tap change module is in the sequence of operations. This required a corresponding map, which was not disclosed in D1 or D4. The subject-matter of claim 1 therefore involved an inventive step over document D1 in combination with the common general knowledge of the skilled person.

The new line of attack based on document D1 in combination with D4 and D12 was late filed and came as a surprise to the respondent. The respondent already in the reply to the appeal, as well as in the letter of 13 July 2021, had extensively argued that document D1 did not disclose feature (d.) as regards determining from the position of the shaft where the tap change module is in the sequence of operations. Thus, the appellant would have had reason to raise the new line of attack with regard to distinguishing feature (d.) at an earlier stage in the proceedings. The new line of attack therefore should not be taken into account in the appeal procedure under Article 13(2) RPBA 2020.

There was also no reason apparent that would have justified re-opening the debate on inventive step in view of document D1 in combination with the common general knowledge based on D4 in the oral proceedings. The request to re-open the debate on that point was therefore to be rejected.

## **Reasons for the Decision**

1. The appeal is admissible.
2. *Main request - Inventive step (Articles 100(a) and 56 EPC)*

The subject-matter of claim 1 of the patent as granted is not obvious in view of document D1 in combination with the common general knowledge of the skilled person based on document D4.

### *2.1 Closest prior art*

It is not in dispute between the parties that document D1, which is acknowledged in the patent under appeal (see paragraph [0003]), can be taken as the prior art closest to the subject-matter of claim 1 of the patent as granted.

### *2.2 Distinguishing features*

- 2.2.1 It is further undisputed that document D1 does not disclose the specific elements of the tap change module as defined in feature (a.) of claim 1, namely a bypass switch assembly, a vacuum interrupter assembly and a selector switch assembly, and that D1 does not disclose a sequence of operations comprising actuating these elements of the tap change module according to feature (b.) of claim 1.

- 2.2.2 The Board further agrees with the respondent that document D1 does not disclose a monitoring system according to feature (d.) of claim 1, which is operable to perform a method comprising determining from the

position of the at least one shaft where the tap change module is in the sequence of operations, the "sequence of operations" being defined in feature (b.) to comprise actuating the bypass switch assembly, actuating the vacuum interrupter assembly and actuating the selector switch assembly.

Document D1 discloses displaying and monitoring the selected tap position ("Stufenstellung", "aktuelle Stellung des Stufenschalters") as well as the actual tap position ("tatsächliche Stufenstellung"). D1, however, does neither disclose the operations as defined in feature (b.), which was undisputed, nor a monitoring system that is operable to determine from the position of the at least one shaft where the tap change module is in the sequence of operations in the sense of feature (d.).

The appellant referred to D1 in column 2, lines 15 to 20, where it is disclosed that the information about the actual position of the tap changer within the range assigned to a tap position ("einer Stufenstellung zugeordneter Bereich") was transmitted to a controller.

The Board is not convinced by the appellant's argument that from this wording determining from the position of the shaft where the tap change module is in the sequence of operations is directly and unambiguously derivable. In particular, the Board does not recognise any clear link between a "range assigned to a tap position" and a sequence of operations in the sense of claim 1.

Rather, it is not directly and unambiguously derivable from the whole of document D1 what is in fact meant by the "actual position within the range assigned to a tap

position". There is particularly no clear hint present in D1 that the range ("Bereich") mentioned in D1 refers to the transition from one tap position ("Stufenstellung") to another tap position to thereby correspond to a sequence of operations that occur during a change of the tap position. Furthermore, the Board considers that the appellant has not provided sufficient evidence for the argument that the skilled person would naturally understand the disclosure of D1 in column 2, lines 15 to 20, using his common general knowledge, such as to correspond to feature (d.) of claim 1.

Whilst it might be true, that it is in principle possible in the tap changer assembly of D1 to determine from the position of the angular shaft 13, with the help of encoder 15, the position of the tap change module in the sequence of operations that effectuate a tap change, document D1 does not provide any clear teaching of a monitoring system operable to do so. This would require some form of map or look-up table, correlating the angular positions of the shaft to the sequence of operations as specified in feature (b.) of claim 1, as was convincingly argued by the respondent.

The Board has therefore come to the conclusion that document D1 at least does not disclose a monitoring system which is operable to perform a method comprising determining from the position of the shaft where the tap change module is in the sequence of operations according to feature (d.).

For the sake of completeness, the Board observes that the patent under appeal in paragraph [0003] indeed acknowledges that document D1 discloses a monitoring system that is operable to perform a method comprising

determining from the position of the at least one shaft where the tap change module is in the sequence of operations according to feature (d.) of claim 1. In the case at hand, however, the respondent, notwithstanding the statement in paragraph [0003] of the patent under appeal, has disputed that document D1 discloses feature (d.), and as a consequence, the Board had to examine whether the respective feature is actually disclosed in D1 or not, such that the statement in paragraph [0003] has become irrelevant.

### 2.3 *Objective technical problem*

The appellant has convincingly argued that determining from the position of the shaft where the tap change module is in the sequence of operations, allows for overseeing the operations and reacting if an error occurs, and in particular, if the switches are correctly actuated in the sequence of operations. This was not contested by the appellant.

The objective technical problem resulting from the technical effect of the distinguishing features (b.) and (d.) as regards the sequence of operations and determining from the position of the at least one shaft where the tap change module is in the sequence of operations, can therefore be considered to be that of how to increase the safety of the tap changer.

### 2.4 *Obviousness*

The solution according to claim 1 is not rendered obvious by the common general knowledge based on document D4.

The Board agrees with the appellant that a tap change module as defined in feature (a.) as well as the sequence of operations of the tap change module in the sense of feature (b.) was known to the person skilled in the art. Reference is particularly made to document D4, see in particular figure 7 as well as paragraphs [0003], [0006] and [0010]. Furthermore, there cannot be any doubt that a tap change is effectuated by turning the shaft to thereby go through a sequence of operations. However, document D4 neither discloses nor suggests determining from the (angular) position of the shaft where the tap change module is in the sequence of operations. This teaching clearly goes beyond the mere knowledge of the skilled person that turning the shaft causes an actuation of the specific elements of the tap change module, because it requires the monitoring system to be set up so that it is in fact configured to determine from the position of the shaft where the tap change module is in the sequence of operations.

Document D22 does not disclose more than document D4 with regard to the distinguishing feature (d.) and the above findings of the Board therefore also apply in view of this document in its function as evidence of the common general knowledge of the skilled person. The question of whether D22 was to be admitted in the appeal procedure could therefore remain unanswered.

2.5 *Conclusion on inventive step in view of D1 in combination with the common general knowledge based on D4*

In light of the above considerations, the Board has come to the conclusion that the subject-matter of claim 1 involves an inventive step over document D1 in

combination with the common general knowledge of the skilled person based on document D4.

Given that the subject-matter of claim 1 is considered to involve an inventive step in view of the distinguishing feature (d.) alone, it was not necessary for the Board to decide on the further questions raised in the appeal of whether document D1 discloses an on-load tap changer and a multi-turn absolute encoder.

*2.6 New line of attack - Admittance (Article 13(2) RPBA 2020)*

2.6.1 Pursuant to Article 13(2) RPBA 2020, applicable in the present case under Article 25(1) RPBA 2020, any amendment to a party's appeal case made after notification of the 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.

2.6.2 During the oral proceedings before the Board, the appellant submitted a new line of attack under Articles 100(a) and 56 EPC against the main request, which was based on a combination of documents D1, D4 and D12. The Board considers the new line of attack to be a new objection constituting an amendment of the appellant's appeal case, which is thus subject to the admissibility requirements laid down in Article 13(2) RPBA 2020.

2.6.3 The appellant argued that the discussion about the distinguishing feature (d.) came as a surprise to them. The Board does not agree with the appellant that the respondent with letter of 13 July 2021 for the first time argued in a substantiated manner that feature (d.) was not disclosed in D1 and that the subject-matter of



claim 1 involved an inventive step *inter alia* in view of this feature.

Rather, the respondent already in the reply to the appeal, in particular on pages 3, 5, 6, 7 and 8, clearly mentioned feature (d.) as a distinguishing feature, which contributed to an inventive step of the subject-matter of claim 1. The further observations on this point, submitted by the respondent with the letter of 13 July 2021, therefore could not have surprised the appellant. It is also not true that the respondent's discussion of feature (d.) in the reply to the appeal was exclusively provided in the context of the precision of detecting the angular position of the shaft 13.

2.6.4 The Board therefore does not recognise the presence of any exceptional circumstances that would justify in the present case taking account of the new line of attack against the main request based on a combination of documents D1, D4 and D12 presented for the first time at the oral proceedings before the Board. On the contrary, the appellant in light of the respondent's arguments provided in the reply to the appeal, had reason to submit the new line of attack already at an earlier stage in the proceedings.

2.6.5 The Board therefore exercised its discretion under Article 13(2) RPBA 2020 not to take into account the new line of attack against the main request in the appeal procedure.

2.7 *Request to re-open the debate on inventive step based on document D1 in combination with the common general knowledge based on D4*

- 2.7.1 During the oral proceedings before the Board, after the debate on the inventive step objection in view of document D1 in combination with the common general knowledge of the skilled person based on D4 had been closed and the Board's conclusions on this issue had been announced by the Chair, the appellant requested that the debate on this point be re-opened. The request was filed also after the Board had announced the decision not to take into account the new line of attack of lack of inventive step over a combination of documents D1, D4 and D12.
- 2.7.2 According to Article 15(5) RPBA 2020, after the Chair has declared the debate closed, no submissions may be made unless the Board decides to re-open the debate (cf. also G 12/91, OJ EPO 1994, 285, reasons 3). A re-opening of the debate constitutes an exception and there is no right of a party to have the debate re-opened (see also R 10/08, reasons 8). Thus the parties have to expect that, as long as the debate is not re-opened, a decision can be announced after deliberation. A re-opening may for instance be possible if a party did not have the chance of filing its full submissions before a decision has been taken or if a party possibly misunderstood that a decision was going to be taken on a given issue. The circumstances of the specific case, however, did not justify re-opening the debate on the question of inventive step in view of document D1 in combination with the common general knowledge of the skilled person based on D4.
- 2.7.3 The appellant's argument, according to which they had the impression that there was a need to further explain the meaning of the range assigned to a tap position according to D1 in column 2, lines 15 to 20 ("einer Stufenstellung zugeordneter Bereich"), does not

convince the Board. Rather, the factual situation did not change in any way during the oral proceedings and the mere fact that the conclusions reached by the Board after the debate was closed were unfavourable to the appellant, is not a sufficient reason that would have justified re-opening the debate on the issue in question. On the contrary, the Board observes that no new and surprising submissions had been made by the respondent during the oral proceedings and the appellant's right to be heard was also duly taken into account since they had had sufficient opportunity to present all arguments and to comment on the respondent's submissions on the point in question prior to the debate being closed. The Chairman announced twice that oral proceedings were going to be interrupted for the Board to deliberate on the question of inventive step over a combination of document D1 with the common general knowledge as reflected in document D4. After the first announcement, the respondent asked to submit further arguments on the issue whether D1 disclosed a multi-turn absolute encoder before interruption for deliberation. Thus the appellant not only would have had the opportunity to file additional arguments, but was also well aware that after deliberation the Board was going to give its conclusion on that issue. It therefore appears that the appellant's request to re-open the debate on inventive step based on document D1 in combination with the common general knowledge (reflected in D4) was rather due to a change of mind after having heard the Board's conclusion.

- 2.7.4 The Board therefore exercised its discretion not to re-open the debate on inventive step in view of document D1 in combination with the common general knowledge of

the skilled person based on D4 during the oral proceedings.

2.8 Obviousness - Line of attack involving document D3

For the sake of completeness, the Board notes that in the further line of attack set out in section 3 of the grounds of appeal, reference was made to document D3 only in respect of the feature that the encoder is of the "multi-turn" type. The appellant did not at any stage suggest that document D3 has any bearing on the feature of determining from the position of the at least one shaft where the tap change module is in its sequence of operations, and the Board cannot see any relevance of D3 to this feature. Hence, the further line of attack referring to D3 is not apt to establish that the subject-matter of claim 1 is obvious.

2.9 *Overall conclusion on the ground for opposition under Article 100(a) and 56 EPC*

Given that the subject-matter of claim 1 of the main request involves an inventive step over document D1 in combination with the common general knowledge of the skilled person and since the appellant's new line of attack in the oral proceedings was not taken into account in the appeal procedure, the Board has decided that the ground for opposition under Articles 100(a) and 56 EPC does not prejudice the maintenance of the patent as granted.

3. *Final result*

Since the ground for opposition under Article 100(a) in connection with Article 56 EPC does not prejudice the maintenance of the patent as granted, and since no

further objection was raised in an admissible manner by the appellant against the main request, the appeal had to be dismissed.

In view of the Board's decision in favour of the respondent's main request, it was not necessary for the Board to decide on the respondent's conditional request for remittal of the case to the department of first instance.

## Order

### **For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:



U. Bultmann

G. Flyng

Decision electronically authenticated