Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 11 May 2021

Case Number: T 1961/17 - 3.5.03

Application Number: 08170550.1

Publication Number: 2194656

IPC: H04B3/54

Language of the proceedings: EN

Title of invention:
Electrical power network management system

Patent Proprietor:
ABB Schweiz AG

Opponents:
AMPRION GmbH
Siemens Aktiengesellschaft

Headword:
Simulated fault currents/ABB

Relevant legal provisions:
EPC Art. 54, 123(2)
RPBA 2020 Art. 13(2)

Keyword:

Novelty - main request (no)
Added subject-matter - auxiliary requests 1 to 3 (yes): intermediate generalisation
Admittance - amended auxiliary request 3 (no): no exceptional circumstances

Decisions cited:

T 1067/97

Europäisches Patentamt
European Patent Office
Office européen des brevets

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 1961/17 - 3.5.03

D E C I S I O N
of Technical Board of Appeal 3.5.03
of 11 May 2021

Appellant I: (Opponent 1)	AMPRION GmbH Rheinlanddamm 24 44139 Dortmund (DE)
Representative:	Lenzing Gerber Stute PartG von Patentanwälten m.b.B. Bahnstraße 9 40212 Düsseldorf (DE)
Appellant II: (Patent Proprietor)	ABB Schweiz AG Brown Boveri Straße 6 5400 Baden (CH)
Representative:	Maiwald Patent- und Rechtsanwaltsgesellschaft mbH Grünstraße 25 40212 Düsseldorf (DE)
Party as of right: (Opponent 2)	Siemens Aktiengesellschaft Werner-von-Siemens-Straße 1 80333 München (DE)
Representative:	Peukert, Christof David Siemens AG, CT IP Otto-Hahn-Ring 6 80200 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 3 July 2017 concerning maintenance of the European Patent No. 2194656 in amended form.**

Composition of the Board:

Chair	K. Bengi-Akyürek
Members:	R. Gerdes
	R. Winkelhofer

Summary of Facts and Submissions

I. The present appeals arise from the interlocutory decision of the opposition division to maintain the present European patent in amended form (Article 101(3)(a) EPC). The decision relied, *inter alia*, on the following prior-art document:

O6: B. Chattopadhyay et al.: "Protection of a distribution network: an adaptive approach", Canadian Journal of Electrical and Computer Engineering, 1 January 1994, pp. 103-112.

II. Oral proceedings before the board were held on 11 May 2021 by means of a videoconference.

- Appellant I (opponent 1) and the respondent requested that the decision under appeal be set aside and that the patent be revoked.

- Appellant II (proprietor) requested that the decision under appeal be set aside and that the oppositions be rejected (**main request**), *in eventu* that the patent be maintained in amended form based on **auxiliary requests I, II, III "new"** (as filed on 23 March 2021) and **auxiliary request III "old"** as filed with the statement of grounds of appeal.

III. Claim 1 of the **main request** reads as follows (appealed decision's feature labelling):

"1.1 A method for adapting at least one set of parameters of at least one Intelligent Electronic Device (IED) of an electrical power network having a

plurality of switching devices (CB), comprising:

1.2 a) reading a present network status of the electrical power network, wherein the present network status includes a present status of the plurality of switching devices (CB);
1.3 b) deducing at least one new set of parameter values for the at least one Intelligent Electronic Device based on a fault current
1.4 c) applying the at least one new set of parameter values to the at least one set of parameters of the at least one Intelligent Electronic Device;

the method characterised in that
1.5.1 the step of deducing is based on a fault current passing through the plurality of monitored switching devices (CB) and
1.5.2 estimating said fault current induced by at least one simulated network fault (F) under consideration of the current network status and a network topology of the electrical power network."

IV. Claim 1 of **auxiliary request I** differs from claim 1 of the main request in that feature 1.3 no longer includes the wording "based on a fault current" and in that features 1.5.1 and 1.5.2 read as follows (amendments indicated by underlining, deletions struck through):

"**1.5.1** the step of deducing said at least one new set of parameter values is based on ~~a~~ simulated fault currents passing through ~~the plurality of~~ all monitored switching devices (CB) and
1.5.2 estimating said simulated fault currents induced by at least one simulated network fault (F) under consideration of the current network status and a network topology of the electrical power network."

V. Claim 1 of **auxiliary request II** differs from claim 1 of auxiliary request I in the following additional feature, which has been appended to the claim:

"**1.5.3** that the network status includes the status of a distributed energy resource connected to the electrical power network and/or the status of a load connected to the electrical power network, wherein the simulated network fault is located in the distributed energy resource."

VI. Claim 1 of **auxiliary request III "old"** differs from claim 1 of auxiliary request II in feature 1.5.3, which reads:

"**1.5.3** that the network status includes the status of a distributed energy resource connected to the electrical power network ~~and/or the status of a load connected to the electrical power network~~, wherein the simulated network fault is located in the distributed energy resource."

VII. Claim 1 of **auxiliary request III "new"** reads as follows:

"A method for adapting at least one set of parameters of at least one Intelligent Electronic Device (IED) of an electrical power network having a plurality of switching devices (CB), comprising:
a) reading a present network status of the electrical power network, wherein the present network status includes a present status of the plurality of switching devices (CB);
b) deducing at least one new set of parameter values for the at least one Intelligent Electronic Device

using a simulated fault current induced by at least one simulated network fault (F) under consideration of the current network status and the network topology of the electrical power network;
c) applying the at least one new set of parameter values to the at least one set of parameters of the at least one Intelligent Electronic Device;
wherein the electrical power network is a microgrid with at least one distributed energy resource (DER) that is connected to a main grid but may operate in an islanded mode in case of severe system disturbances, and wherein the method [is] characterised in that

- the step of deducing comprises: for a set of microgrid configurations as well as on/off feeding states of distributed energy resources (DERs), estimating fault currents passing through all monitored switching devices (CB) by simulating short-circuits in different locations of the protected microgrid at a time, wherein, during repetitive short-circuit calculations, a topology or a status of a single distribute energy resource (DER) is modified between iterations, and
- the simulated network fault is located in the distributed energy resource."

Reasons for the Decision

1. The opposed patent

The patent in suit concerns electrical power networks having a plurality of switching devices such as circuit breakers. These power networks undergo considerable changes in operating conditions - mainly as a result of load variation and distributed energy resources (DER), such as wind and solar power plants. In order to

protect the network from failures (e.g. short-circuits), programmable, microprocessor-based relays are employed, allowing relay characteristics to be adapted even after the relays have been installed in a power system. Intelligent electronic devices (IEDs) are used to control the relays. Usually, several pre-computed parameter sets are stored in the relays. During operation, a human operator can switch the active parameter set by sending a control signal to the relay (see paragraphs [0001] to [0007] of the patent as granted).

The patent in suit is concerned with augmenting the capabilities of the IEDs to detect the need for protection-setting adaptation and either inform a human operator of the need or to perform the parameter settings automatically and autonomously, with the ultimate goal of improving selectivity, sensitivity and speed of the setting adaptation. For this purpose, new sets of parameters for the IEDs are deduced from simulated network faults under consideration of the network status and the network topology (see paragraphs [0015], [0017], [0036] and [0082] of the patent as granted).

2. Main request - novelty

2.1 The opposition division found that features 1.5.1 and 1.5.2 of claim 1 as granted infringed Article 123(2) EPC (cf. appealed decision, Reasons, point 10.3.2). Given that claim 1 as granted lacks novelty (see points 2.2 to 2.7 below), this issue can be left open.

2.2 Similarly to the patent in suit, prior-art document **O6** describes a scheme adapting relay settings to load,

generation-level or system-topology changes in a distribution network (see O6, abstract). The adaptive relaying system continuously monitors the state of a power system, which includes reading a present status of the plurality of switching devices (see sections IV.B.2 and IV.C.1). O6 also discloses features 1.3 and 1.5.1 of deducing parameter values for the IED based on a fault current passing through the plurality of monitored switching devices (see sections IV.B.2 and IV.B.3). As required by feature 1.5.2, the estimation of the fault current induced by at least one simulated network fault is carried out under consideration of the current network status and a network topology of the electrical power network (see section IV.B.1 to IV.B.3). The new set of parameter values is then applied to the IED, i.e. the "relay" device (section IV, first paragraph and section II, second paragraph).

2.3 Appellant II disputed that O6 disclosed features 1.5.1 and 1.5.2 of claim 1. The parameter changes of O6 were implemented based on measured conditions rather than "simulated fault currents". The "prefault currents" of O6 were computed using simulation software, however, the fault currents were measured currents. Page 107, left-hand column, last paragraph, showed that prefault currents were calculated for faults on each line, but not "simulated fault currents" passing through the monitored switching devices. The state estimation software only determined *prefault* currents and not *simulated* short circuits (see O6, page 106, section IV.B.3 and page 107, left-hand column, last paragraph).

2.4 This is not convincing. First, present claim 1 does not mention "simulated fault currents". Secondly, O6

discloses that the "state estimator" calculates prefault currents whereas the "fault analysis program" calculates currents for faults on each line, which are superimposed on the prefault currents (see sections IV.B.2, IV.B.3 and page 107, left-hand column, last paragraph). This implies that fault currents passing through the plurality of monitored switching devices are indeed simulated. Finally, it clearly follows from the passages cited in point 2.1 above that the estimation of fault currents is performed "under consideration of the current network status and the network topology".

2.5 Appellant II further argued that feature 1.5.1 should be interpreted such that the step of deducing was based on "fault current**s** passing through **all** monitored switching devices", i.e. that the claim should be understood in the sense of claim 1 of auxiliary request I, which explicitly refers to *all* monitored switching devices.

2.6 The board notes that feature 1.5.1 of claim 1 of the main request reads "the step of deducing is based on a fault current passing through the plurality of monitored switching devices", i.e. the feature refers to "a fault current" and not plural fault currents. Moreover, the board cannot see why the wording of the claim should be regarded as being limited to a fault current passing through all and not only a part of the monitored switching devices. Besides the fact that feature 1.5.1 does not comprise such a limitation, this restrictive interpretation would exclude the embodiment of the "first practical example" of the invention from the claimed subject-matter (see paragraphs [0119] to [0130] with reference to figures 3 to 5 of the patent as granted). According to that example, there is

no fault current in the second feeder 20. Hence, such interpretation would be technically inconsistent.

2.7 In conclusion, document O6 discloses all features of claim 1 of the main request. It follows that the subject-matter of claim 1 lacks novelty in view of O6 (Article 100(a) in conjunction with Articles 54(1) and (2) EPC).

3. Auxiliary request I - added subject-matter

3.1 Claim 1 of **auxiliary request I** has been amended in features 1.5.1 and 1.5.2 by explicitly referring to "simulated fault currents passing through all monitored switching devices" (board's emphasis).

3.2 According to the jurisprudence of the boards of appeal, if a claim is restricted to a preferred embodiment, it is normally not allowed under Article 123(2) EPC to extract isolated features from a set of features which have originally been disclosed in combination for that embodiment. Such an amendment (intermediate generalisation) would only be justified in the absence of a clearly recognisable functional or structural relationship among said features (cf. T 1067/97, Reasons, point 2.1.3).

3.3 In the present case, amended features 1.5.1 and 1.5.2 are however disclosed in paragraphs [0169] to [0176] of the underlying application (as published) in the context of an "off-line analysis" and for the particular network type of a "microgrid".

3.4 Apart from this passage, appellant II referred to claim 1 as filed as a basis for the amendments in the original application. Claim 1 provided a general

definition of the invention and did not relate to a "microgrid" and an "off-line simulation". In addition, figures 6 to 8 included a microgrid, but the fault did not need to be located in the microgrid, which was illustrated by table 1 (faults F1 and F2). The fact that the fault analysis was carried out in an off-line mode was also indicated by the reference in claim 1 to simulated fault currents.

3.5 The board agrees that claim 1 as filed provides a general definition of the invention, which can be considered to encompass the subject-matter of claim 1 of auxiliary request I. However, the presence of a more general definition of the invention is only a prerequisite for the allowability of an intermediate generalisation. The decisive question in this case is whether the amendments to features 1.5.1 and 1.5.2 can be extracted in isolation from the original teaching of the description, in particular from paragraph [0169] of the application as published.

It is correct that, for example, figure 7 and table 1 disclose faults in the main medium voltage (MV) grid and in the distribution transformer, respectively. However, as argued by appellant I, paragraphs [0169] to [0176] only concern an *adaptation* of the microgrid. For this purpose, an "event table" is set up, which reflects the status of all circuit breakers in the microgrid (see figures 8 and 10 together with paragraph [0169] of the application as published). Faults in the MV grid are managed by the MV system (see paragraph [0139]) and are not reflected in the event table.

It can also not be said that the reference to simulated fault currents implicitly requires an off-line fault

analysis. Simulations can be carried out on-line and off-line. The simulation of O6 is, for example, carried out in a (slow) online mode with relay settings being modified at one-hour intervals (see abstract, second sentence and section VI, first paragraph).

Hence, there is a clearly recognisable functional or structural relationship between the simulation of fault currents passing through all monitored switching devices of the *microgrid* and the *off-line simulation* using an event table.

3.6 Therefore, claim 1 of auxiliary request I contains subject-matter extending beyond the content of the application as filed (Article 123(2) EPC).

4. Auxiliary requests II and III "old" - added subject-matter

4.1 Claim 1 of **auxiliary request II** has been limited by the addition of feature 1.5.3 which specifies that the network status includes the status of a distributed energy resource connected to the electrical power network and/or the status of a load connected to the electrical power network. It also specifies that the simulated network fault is located in the distributed energy resource. In claim 1 of **auxiliary request III "old"**, the second alternative relating to the status of a load has been deleted.

4.2 These amendments do not relate to the "microgrid" and the "off-line simulation" using an "event table". Hence, the finding regarding added subject-matter of claim 1 of auxiliary request I also applies to claim 1 of auxiliary request II and auxiliary request III "old".

4.3 As a result, auxiliary requests II and III "old" are not allowable under Article 123(2) EPC either.

5. Auxiliary request III "new" - admittance

5.1 Besides some reformulations made with regard to the main request, the independent claims of **auxiliary request III "new"** have been amended to specify that "the electrical power network is a microgrid with at least one distributed energy resource (DER) that is connected to a main grid but may operate in an islanded mode in case of severe system disturbances".

They additionally specify that "the [step of] deducing comprises: for a set of microgrid configurations as well as on/off feeding states of distributed energy resources (DERs), estimating fault currents passing through all monitored switching devices (CB) by simulating short-circuits in different locations of the protected microgrid at a time, wherein, during repetitive short-circuit calculations, a topology or a status of a single distribute energy resource (DER) is modified between iterations". Finally, the feature that "the simulated network fault is located in the distributed energy resource" has been appended to the independent claims (cf. point VII. above).

5.2 Auxiliary request III "new" was filed *after* notification of the summons to oral proceedings before the board. Hence, its admittance is subject to Article 13(2) RPBA 2020, which specifies that "[a]ny 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". In the application of Article 13(2) RPBA 2020, also the criteria of Article 13(1) RPBA 2020, such as *prima facie* allowability of an amended patent, may be used.

5.3 Appellant II argued that the amendments served to expedite the procedure, because auxiliary request III "new" replaced the previous auxiliary requests III "old", IV, IVa, IVb, V, Va, VI, VIa, VII, VIIa, VIII, VIIIa, IX, and IXa, which comprised formulations whose basis in the application as filed was under discussion. The purpose of the amendments was therefore to save discussion time on the issue of added subject-matter, allowing to focus on the issue of patentability instead. This was in the interest of procedural economy that Article 13(2) RPBA 2020 was to improve. Therefore, the amendment was deemed to be justified by a cogent reason as required by Article 13(2) RPBA 2020.

Moreover, the additional features were based on paragraphs [0008], [0081] and figure 8 together with paragraph [0169] of the application as published. By including these features, the claims clearly overcame the objection under Article 123(2) EPC against the previously submitted requests.

5.4 As to the procedural aspects of the case, the board notes that the objection regarding an unallowable intermediate generalisation of features from the embodiment in paragraphs [0169] to [0176] of the application as published had already been brought forward by the opponents in the opposition proceedings and have been repeated with the appellant I's statement of grounds of appeal and thus prior to the notification of the summons to oral proceedings (see decision under appeal, Reasons, point 10.1.4 and statement of grounds

of appeal, section II.1).

Hence, the amendments were not made in reaction to *new* objections. Also the fact that auxiliary request III "new" was submitted as a replacement for other auxiliary requests cannot normally be considered as "exceptional circumstances" within the meaning of Article 13(2) RPBA 2020. Assessing the admittance of new claim requests depending on the withdrawal of other claim requests could lead to a circumvention of that Article, because according to such a logic one could induce the admittance of a claim request by filing a large number of claim requests early and then withdrawing them. Hence, the admittance of a claim request under Article 13(2) RPBA 2020 is normally to be assessed on the merits of that request only.

5.5 As to the clear allowability of claim 1 of auxiliary request III "new", it is apparent that the objection regarding unallowable intermediate generalisation as to auxiliary requests I to III "old" cannot be considered overcome, since the amended claims do not relate to an off-line analysis and an event table (Article 123(2) EPC).

5.6 Hence, auxiliary request III "new" could not be admitted into the proceedings (Article 13(2) RPBA 2020).

6. Conclusion

Since there are no allowable claim requests on file, appellant I's appeal is to be granted and the patent be revoked.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chair:

B. Brückner K. Bengi-Akyürek

Decision electronically authenticated