Internal distribution code:

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

Datasheet for the decision of 28 July 2020

Case Number: T 1875/16 - 3.5.03

Application Number: 10165325.1

Publication Number: 2395404

IPC: H04L29/06

Language of the proceedings: EN

Title of invention:
Secure clock synchronization

Patent Proprietor:
ABB Power Grids Switzerland AG

Opponent:
Siemens Aktiengesellschaft

Headword:
Secured synchronisation message/ABB

Relevant legal provisions:
EPC Art. 54, 56, 107

Keyword:
Novelty - main and sixth auxiliary requests (no)
Inventive step - first to fifth auxiliary requests (no)
Prohibition of reformatio in peius: seventh auxiliary request not to be challenged

Decisions cited:
G 0009/92, G 0001/99, T 0060/91

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 1875/16 - 3.5.03

D E C I S I O N
of Technical Board of Appeal 3.5.03
of 28 July 2020

Appellant: (Patent Proprietor)	ABB Power Grids Switzerland AG Bruggerstrasse 72 5400 Baden (CH)
Representative:	Vossius & Partner Patentanwälte Rechtsanwälte mbB P.O. Box 86 07 67 81634 München (DE)
Respondent: (Opponent)	Siemens Aktiengesellschaft Werner-von-Siemens-Straße 1 80333 München (DE)
Representative:	Siemens AG Postfach 22 16 34 80506 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 10 May 2016 concerning maintenance of the European Patent No. 2395404 in amended form.**

Composition of the Board:

Chair	K. Bengi-Akyürek
Members:	K. Schenkel
	R. Romandini

Summary of Facts and Submissions

I. The appeal of the patent proprietor lies from the interlocutory decision of the Opposition Division maintaining the present European patent in amended form on the basis of a third auxiliary request as filed on 12 February 2016. The higher-ranking requests, a main request and a first and a second auxiliary request, were found to lack novelty, having regard to the disclosure of

D1: DE 10 2005 025 325 A1.

II. Oral proceedings before the board were held on 28 July 2020.

- The appellant's final requests were that the decision under appeal be set aside and that the opposition be rejected, i.e. the patent be maintained as granted (main request), or, in the alternative, that the patent be maintained in amended form on the basis of one of first to twelfth auxiliary requests, all auxiliary requests as filed with the statement of grounds of appeal.

- The respondent's final request was that the appeal be dismissed.

At the end of the oral proceedings, the board's decision was announced.

III. Claim 1 of the **main request** reads as follows:

"A method of synchronizing clocks connected to a communication network, comprising sending, by a master

clock, a synchronization message including a time stamp, and receiving the synchronization message by a slave clock, further comprising
- preparing, prior to a projected send time t_{send}, a synchronization message including a time stamp of the projected send time t_{send},
- securing the synchronization message, and
- sending, at the projected send time t_{send}, the secured synchronization message."

IV. Claim 1 of the **first auxiliary request** differs from claim 1 of the main request in that the preparing step reads as follows (amendments underlined by the board):

"- preparing, by the master clock and prior to a projected send time t_{send}, a synchronization message including a time stamp of the projected send time t_{send},".

V. Claim 1 of the **second auxiliary request** differs from claim 1 of the first auxiliary request in that the securing step reads as follows (amendments underlined by the board):

"- securing, in advance of the projected send time, the synchronization message, and".

VI. Claim 1 of the **third auxiliary request** differs from claim 1 of the first auxiliary request in that in the first paragraph, before the phrase "further comprising", the following wording is inserted:

"wherein the master and slave clocks are clocks according to IEEE 1588,".

VII. Claim 1 of the **fourth auxiliary request** differs from claim 1 of the main request in that the securing step reads as follows (amendments underlined by the board):

"- securing the synchronization message with a shortest possible delay, and".

VIII. Claim 1 of the **fifth auxiliary request** differs from claim 1 of the main request in that the securing step reads as follows (amendments underlined by the board):

"- securing, by cryptographic means, the synchronization message with a shortest possible delay, and".

IX. Claim 1 of the **sixth auxiliary request** differs from claim 1 of the main request in that the following step is inserted between the securing step and the sending step:

"- starting the preparation of the secured synchronization message at a time t_{prep} preceding the projected send time t_{send} by Δt".

X. The claims of the **seventh auxiliary request** correspond to the claims of auxiliary request 3 as maintained by the impugned decision.

Reasons for the Decision

1. Background of the opposed patent

The present patent relates to the synchronisation of clocks connected via a communication network by means

of synchronisation messages including a time stamp which are sent from a "master clock" to a "slave clock" (paragraph [0005] of the patent specification, henceforth "patent").

In particular, the synchronisation message is secured by suitable cryptographic means ensuring at least its authentication and integrity, for example, by calculating and signing a checksum or hash of the synchronisation message (end of paragraph [0010] of the patent). The background section and the embodiments refer to the IEEE 1588 standard (paragraphs [0005] and [0015] of the patent).

2. Main request - novelty

2.1 Claim 1 of the main request includes the following limiting features, as labelled by the board:

A method of synchronising clocks connected to a communication network, comprising

(a) sending, by a master clock, a synchronisation message including a time stamp, and receiving the synchronisation message by a slave clock;

(b) preparing, prior to a projected send time t_{send}, a synchronisation message including a time stamp of t_{send};

(c) securing the synchronisation message;

(d) sending, at t_{send}, the secured synchronisation message.

2.2 Prior-art document **D1** discloses a method of transmitting synchronisation messages, including a time stamp ("Zeitstempel"), within a communication network from a sending component, i.e. implicitly a master clock, to a receiving component, i.e. implicitly a

slave clock (see paragraphs [0018] and [0020]) in accordance with feature (a) of claim 1. Furthermore, the board follows the argumentation of the respondent that - in the absence of a more detailed definition of a "synchronisation message" - the term "synchronisation message" may be construed in a broad sense, i.e. as encompassing any message suitable for synchronising clocks and including a time stamp or, in more general words, a time information. Therefore, the combination of the message "PTP-M" (Precision Time Protocol message, also called "Synchronisierungs-Nachricht" in D1) and the electronic signature "CT" (Crypto Token) may indeed be read onto the broad term "synchronisation message" as claimed.

2.3 As to feature (b), the board agrees with the respondent that the information about the send time ("Sendezeit") is to be understood as the time instant at which the secured synchronisation message is actually *sent* within the meaning of "projected send time" as claimed, rather than the point in time at which the message is *generated*, as persistently assumed by the appellant in the written and oral proceedings. Hence, the board concludes that the "projected send time t_{send}" of features (b) and (d) and the information about the send time in D1 refer both to the point in time when the synchronisation message is *actually* sent and therefore these data items correspond to equivalent time information and not to different data, as put forward by the respondent in view of the word "projected" in feature (b).

2.4 Moreover, the synchronisation message of D1, i.e. the combination of PTP-M and CT, is secured by calculating a hash value ("Hash-Wert") over both message fields and by inserting it into the CT field (paragraph [0022]:

"... wird der Hash-Wert sowohl über ... PTP-M ... als auch über die elektronische Signatur CT errechnet ..." and paragraph [0023]). From this it follows that in D1 the step of securing is in fact applied to a message including information about the "send time". Given that the signature CT includes an information about the send time ("Angabe über die Sendezeit", see paragraph [0021]) and that CT is part of the "synchronisation message" of D1, features (b) and (c) are also considered to be anticipated.

Lastly, as to feature (d), the step of eventually sending the secured synchronisation message of D1 at the projected send time ("Sendezeit"), is also disclosed in D1 (see e.g. paragraph [0007]: "... die derart elektronisch signierte Synchronisierungs-Nachricht übertragen wird ...").

2.5 It was further argued that there may be a delay between the point in time referred to in the information about the send time within the signature CT and the point in time when the secured message is actually sent and that the skilled person would not pay much attention to this delay and thus tolerate it.

The board, however, considers that this is a mere speculation and, in agreement with the respondent, that the term send time ("Sendezeit") of D1 is clear and does not need to be interpreted.

2.6 The appellant further argued that in D1 the message PTP-M and its signature CT were separate entities, and referred in this respect to paragraph [0022] where it was indicated that a hash value is calculated for the synchronisation message as well as for the electronic signature CT. The signature CT was an *appendix* to PTP-M

and not *part* of it.

In view of the board's conclusion set out in point 2.3 above, namely that the message PTP-M *together with* the signature may be taken in D1 as the "synchronisation message" within the meaning of claim 1, this argument becomes moot. A skilled person would also not take the time information ("Sendezeit") comprised in the signature and put it into another field, in particular into the field of the time stamp ("Zeitstempel"). The board holds that this assumption is only relevant for the *processing* of a received synchronisation message which is however not the subject of the method of claim 1. It may, for the sake of argument, be relevant whether or not the time information within the signature could be considered to be a time stamp in the sense of claim 1. In this respect, the board again notes that claim 1 does not further specify the synchronisation message nor the time stamp which therefore can be understood as corresponding to the message PTP-M together with the information about the send time in the signature CT of D1.

2.7 The appellant further referred to paragraph [0030] of D1 where the problem of a delay caused by the securing process is mentioned and the use of the IEEE 1588 protocol stack is proposed as a solution to this problem. The skilled person, starting out from D1, would therefore have used the mechanisms implemented in the IEEE 1588 standard rather than the information about the send time in the signature.

The board finds that, even if the IEEE 1588 protocol stack would be able to cope with delays caused by securing the message, it does not change the fact that the secured message in D1 includes information about

the "send time". The further processing of the message after sending it is however not embraced by the method of claim 1.

2.8 The subject-matter of claim 1 of the main request is therefore not new over D1. Hence, the main request is not allowable under Articles 52(1) and 54 EPC.

3. First auxiliary request - inventive step

3.1 Claim 1 of the **first auxiliary request** adds the feature that the synchronisation message is prepared by the master clock.

3.2 D1 does not explicitly disclose that the synchronisation message is *prepared* by the sending component which is implicitly the master clock, but it is an obvious implementation measure for a skilled person in the field of telecommunication networks to let the sending component, which is supposed to send the synchronisation message, also prepare it in order to limit the associated implementation complexity.

3.3 The subject-matter of claim 1 of the first auxiliary request does therefore not involve an inventive step over D1. Hence, the first auxiliary request is not allowable under Articles 52(1) and 56 EPC.

4. Second auxiliary request - inventive step

4.1 Claim 1 of the **second auxiliary request** adds to claim 1 of the first auxiliary request that the step of securing the synchronisation message takes place in advance of the projected send time.

4.2 Since the "projected send time" is considered to be the actual send time, it is implicit that the synchronisation message has to be already fully processed at the send time or, in other words, that all processing steps have to take place in advance of that "projected send time" according to feature (b).

4.3 The appellant argued that D1 was silent as to the time instant of creating the signature and of generating the hash value. The board notes that, even if D1 does not specify these points in time, the above conclusions still hold true, i.e. that the processing of the message needs to be finished *before* sending.

4.4 Claim 1 of the second auxiliary request, therefore, does not involve an inventive step either. Thus, the second auxiliary request is likewise not allowable under Articles 52(1) and 56 EPC.

5. Third auxiliary request - inventive step

5.1 Claim 1 of the **third auxiliary request** adds to claim 1 of the first auxiliary request the feature that the master clock and the slave clock are clocks according to the IEEE 1588 standard.

5.2 The "IEEE 1588" standard is however already known from D1, it being noted that the processing of IEEE 1588 messages imply the use of clocks according to the IEEE 1588 standard (see e.g. paragraph [0020]).

5.3 Therefore, claim 1 of the third auxiliary request does not involve an inventive step. Hence, the third auxiliary request is not allowable under Articles 52(1) and 56 EPC either.

6. Fourth auxiliary request - inventive step

6.1 Claim 1 of the **fourth auxiliary request** adds to claim 1 of the main request the feature that securing the synchronisation message occurs with a shortest possible delay.

6.2 Since the latency caused by generating and securing the synchronisation message is identified as a problem to be solved in D1, it is obvious for a skilled person that these steps should be carried out as fast as possible, i.e. with the "shortest possible delay", to minimise that problem. The board further notes that reducing delays is a generally well-known aim in data processing systems.

6.3 The added feature, therefore, does not contribute to an inventive step. Consequently, also the fourth auxiliary request is not allowable under Articles 52(1) and 56 EPC.

7. Fifth auxiliary request - inventive step

7.1 Claim 1 of the **fifth auxiliary request** adds to claim 1 of the fourth auxiliary request that the synchronisation message is secured by cryptographic means.

7.2 In that regard, the board notes that D1 already discloses securing the synchronisation message (i.e. the combination of the PTP-M and CT fields) by cryptographic means (see e.g. paragraph [0020]: "Crypto Token" and "elektronische Signatur").

7.3 Claim 1 of the fifth auxiliary request therefore does not involve an inventive step. Hence, the fifth

auxiliary request is not allowable under Articles 52(1) and 56 EPC, too.

8. Sixth auxiliary request - novelty

8.1 Claim 1 of the **sixth auxiliary request** adds to claim 1 of the main request that the preparation of the secured synchronisation message is started at a time t_{prep} preceding the projected send time by Δt.

8.2 Since the secured synchronisation message is inherently prepared prior to the (projected) send time (see point 4.2 above), it is implicit that the preparation occurs at a different point in time preceding the send time by a time difference Δt greater than zero, it being noted that the time difference "Δt" is not further specified. Hence, the added feature does not constitute a further limitation of the claim.

8.3 The subject-matter of claim 1 of the sixth auxiliary request is therefore not new. Thus, the sixth auxiliary request is not allowable under Articles 52(1) and 54 EPC.

9. Seventh auxiliary request - reformatio in peius

9.1 The claims of the **seventh auxiliary request** are identical to the claims of the third auxiliary request, which was maintained by the Opposition Division.

9.2 According to the principle of the "prohibition of *reformatio in peius*" as recognised by the jurisprudence of the Boards of Appeal, "a decision may not be reached which would put an appellant in a worse position than it was in under the impugned decision" (see G 1/99, OJ EPO 2001, 381, Reasons, point 2.1; T 60/91, OJ EPO

1993, 551, Reasons, point 7).

9.3 In the present case, the patent proprietor is the sole appellant against an interlocutory decision maintaining its patent in amended form. As a consequence, neither the board nor the non-appealing opponent (respondent) being a party to these appeal proceedings as of right under Article 107, second sentence, EPC, may challenge the maintenance of the patent as amended in accordance with that interlocutory decision (see G 9/92, OJ EPO 1994, 875, Headnote I). Hence, the seventh auxiliary request cannot be challenged.

10. As there is no allowable claim request ranking higher than the seventh auxiliary request as maintained by the Opposition Division, it follows that the appeal is to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

B. Brückner K. Bengi-Akyürek

Decision electronically authenticated