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Datasheet for the decision of 11 July 2017

Case Number: T 1850/15 - 3.2.03

Application Number: 01956824.5

Publication Number: 1308691

IPC: F42B3/12, B60R21/26

Language of the proceedings: EN

Title of invention:
ELECTRIC INITIATOR AND INITIATOR ASSEMBLY USING IT

Patent Proprietor:
Daicel Chemical Industries, Ltd.

Opponents:
NIPPON KAYAKU CO., LTD.
TRW Airbag Systems GmbH
EMS-PATENT AG

Headword:

Relevant legal provisions:
EPC Art. 123(2), 83, 84, 54, 56
RPBA Art. 12(4)

Keyword:
Novelty - main request (no) - auxiliary requests - public prior use (no)
Claims - clarity after amendment (no)
Amendments - extension beyond the content of the application as filed (no)
Sufficiency of disclosure - (yes)
Late-filed request - admitted (yes)
Inventive step - auxiliary request 9a (yes)

Decisions cited:

Catchword:

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Case Number: T 1850/15 - 3.2.03

D E C I S I O N
of Technical Board of Appeal 3.2.03
of 11 July 2017

Appellant: (Patent Proprietor)	Daicel Chemical Industries, Ltd. Mainichi Intecio 3-4-5, Umeda Kita-ku, Osaka-shi Osaka 530-0001 (JP)
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Party as of right: (Opponent 3)	EMS-PATENT AG Via Innovativa 1 7013 Domats/Ems (CH)
Representative:	Pfenning, Meinig & Partner mbB Patent- und Rechtsanwälte Joachimsthaler Straße 12 10719 Berlin (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 30 July 2015 concerning maintenance of the European Patent No. 1308691 in amended form.**

Composition of the Board:

Chairman	G. Ashley
Members:	B. Miller
	E. Kossonakou

Summary of Facts and Submissions

I. In the interlocutory decision of 30 July 2015 the opposition division found that European patent EP-B-1 308 691 met the requirements of the EPC, on the basis of the claims of auxiliary request 3 filed at the oral proceedings held on 24 March 2015.

II. This decision was appealed by
- the patent proprietor (Daicel Chemical Industries, Ltd.),
- opponent 1 (Nippon Kayaku Co. Ltd.) and
- opponent 2 (TRW Airbag Systems GmbH).

As the patent proprietor and two of the three opponents are appellants and respondents in the present proceedings, for simplicity the Board will continue to refer to the parties as "the proprietor", "opponent 1", "opponent 2" and "opponent 3".

III. The proprietor requested that the decision of the opposition division be set aside and the patent be maintained on the basis of the claims as granted (main request) or on the basis of the claims of either one of auxiliary requests 1 to 9 filed with the reply to the grounds of appeal of the opponents on 26 April 2016, auxiliary request 1 being the one on the basis of which the opposition division considered that the patent could be maintained, or of auxiliary requests 2a and 9a filed during the oral proceedings before the Board.

IV. Opponents 1 and 2 requested that the decision of the opposition division be set aside and the patent be revoked.

They also requested the reimbursement of the appeal fee on the ground of a substantial procedural violation committed by the opposition division.

V. The following documents have been cited by the parties.

(a) Documents filed already in the opposition proceedings:

E1: JP 9-126697 and its translation into English
E2: US 5243492
E3: MIL-HDBK-1512 cover sheet and Method 202 and 205
E10: Affidavit of Mr Werner Müller and Investigation Report "PATVAG"
E10a: Affidavit of Mr Werner Müller and Investigation Report "PATVAG" (corrected)
E10b: enlarged figure 17 of E10/E10a
E11: Affidavit of Mr Werner Müller and Investigation Report "SDI"
E13: ESD examination report "PATVAG"

(b) Documents filed in appeal proceedings:

E28: DE 19917236
E29: US 5639986
E30: US 5140906
E31: Public prior use PATVAG 2
E31a: enlarged picture 21 of E31
E31b: enlarged picture 21 of E31 in A3 format
E32: enlarged picture 17 of E10a in A3 format

VI. Independent claim 1 of each request reads (including a feature numbering proposed by the proprietor):

Main request (claim 1 as granted)

1a) "An electric type initiator (1;101) comprising
1b) two electroconductive bodies (10a, 12; 110a, 110b),
1c) an insulating body (13) provided between top portions of the electroconductive bodies(10a, 12; 110a, 110b), and
1d) an electric resistance wire (15; 115) spanned between the top portions of the electroconductive bodies (10a, 12; 110a, 110b)
1e) which are exposed from an upper end portion of the insulating body (13), and
1f) the top portions of the two electroconductive bodies (10a, 12; 110a, 110b) arranged to be flush with an upper end surface of the electric insulating body (13),
1g) characterized by a distance (L) of the electric insulating body (13) between the top portions of the two electroconductive bodies (10a, 12; 110a, 110b) is set to be not less than 0.8 times a horizontal distance (l) of a portion which determines the resistance value of the electric resistance wire (15; 115) between the electroconductive bodies (10a, 12; 110a, 110b)."

Auxiliary request 1

Claim 1 corresponds to claim 1 of the main request wherein between feature 1f) and 1g) the following features have been added:

1h) "wherein end portions of the electric resistance wire (15; 115) are welded to the respective electroconductive bodies (10a, 12; 110a, 110b)
characterised in that

1i') a portion (l-L) of the electric resistance wire (15; 115) which is not welded to the electroconductive bodies (10a, 12; 110a, 110b) is suspended,

1i'') the electric resistance wire (15; 115) is formed of an extremely thin wire, and thereby, when a current is applied to the electric resistance wire (15; 115), the suspended portion touches either one or both of the electroconductive bodies (10a, 12; 110a, 110b) to change the resistance value of the electric resistance wire (15; 115),"

Auxiliary request 2

Claim 1 corresponds to claim 1 as granted wherein feature 1i') and the following feature 1j) is added

1j) "and the change in the resistance value between the electroconductive bodies (10a, 12; 110a, 110b) after a voltage of 25 kv is applied between two electroconductive pins (10a, 10b; 110a, 110b) more than five times in an electric circuit for conducting a test provided in MIL-STD-1512 METHOD 205 of MIL standard in which a charging capacity is 150 PF and a discharging resistance is 500 Ω is within 10% of the resistance value between the electroconductive bodies (10a,12; 110a, 110b) before application of the voltage."

Auxiliary request 2a

Claim 1 corresponds to claim 1 of auxiliary request 2 wherein feature 1h) is added.

Auxiliary request 3

Claim 1 corresponds to claim 1 of auxiliary request 1 wherein feature 1j) is added.

Auxiliary request 4

Claim 1 corresponds to claim 1 of auxiliary request 1 wherein the following feature 1k) is added:

1k) "wherein the electric type initiator (1) comprises a first electroconductive pin (10a), a metallic eyelet (12) having a hole (11) through which the electroconductive pin (10a) passes and electrically connected with a second electroconductive pin (10b), and an insulating body (13) filled in the hole to insulate the first electroconductive pin (10a) from the eyelet (12), wherein the two electroconductive bodies (10a, 12) are the first electroconductive pin (10a) and the metallic eyelet (12) electrically connected to the second electroconductive pin (10b)".

Auxiliary request 5

Claim 1 corresponds to claim 1 of auxiliary request 4 wherein in feature 1g) the term "less than 0.8 times a horizontal distance" has been amended to read "less than 0.9 times a horizontal distance".

Auxiliary request 6

Claim 1 corresponds to claim 1 as granted wherein feature 1k) is added.

Auxiliary request 7

Claim 1 corresponds to claim 1 of auxiliary request 6 wherein in feature 1g) the term "less than 0.8 times a horizontal distance" has been amended to read "less than 0.9 times a horizontal distance".

Auxiliary request 8

Claim 1 corresponds to claim 1 of auxiliary request 6 wherein feature 1i') is added.

Auxiliary request 9

Claim 1 corresponds to claim 1 of auxiliary request 8 wherein in feature 1g) the term "less than 0.8 times a horizontal distance" has been amended to read "less than 0.9 times a horizontal distance".

Auxiliary request 9a

Claim 1 corresponds to claim 1 of auxiliary request 9 wherein feature 1h) is added.

VII. The proprietor presented in summary the following arguments.

(a) Admissibility of auxiliary requests 2 to 9 and 2a and 9a

Auxiliary requests 2 to 9 were filed directly in reply to the statements setting out the grounds of appeal of the opponents and therefore at the earliest possible time in the appeal proceedings. Auxiliary requests 2a and 9a filed during the oral proceedings were based on auxiliary requests 2 and 9 respectively and contained

only minor amendments in order to overcome the objections raised by the opponents.

(b) Main request

The term "spanned" in feature 1d) had to be understood as meaning "suspended" and implied that there was a part of the electric resistance wire with a distance between wire and top surfaces of the electroconductive bodies.

None of the documents cited by the opponents disclosed an initiator wherein the wire was suspended.

(c) Auxiliary request 1

The term "extremely thin wire" of feature 1i'') was clear to the skilled person. The skilled person knew what a thin electric resistance wire was. Moreover, the further described functionality gave a clear guidance to the skilled person which thickness was intended.

(d) Auxiliary request 2

The subject-matter of claim 1 corresponded to the teaching of paragraphs [0021] and [0025] of the application as originally filed.

(e) Auxiliary request 2a

Starting from E11 as the closest prior art it was not obvious to use a suspended bridge wire. None of the cited documents provided any motivation to replace a flat wire by a suspended wire and thereby to pay attention to the L/l ratio in order to achieve an

improved electric characteristic and a higher reliability.

(f) Auxiliary request 3

The term "extremely thin wire" in claim 1 was further clarified by the test method defined in feature 1j).

(g) Auxiliary requests 7

Starting from E11 as the closest prior art it was not obvious to replace a flat wire by a suspended wire and thereby to pay attention to the L/l ratio for improving the electric characteristics and reliability.

(h) Auxiliary request 9

The subject-matter of claim 1 corresponded to the teaching of paragraphs [0021] and [0025] of the application as originally filed.

(i) Auxiliary request 9a

The subject-matter of claim 1 corresponded to the teaching of paragraphs [0021] and [0025] of the application as originally filed and was clear to the skilled person.

The skilled person was able to produce an initiator wherein the electric resistance wire was welded in a position to achieve a L/l ratio of not less than 0.9.

None of the cited documents disclosed an initiator comprising a suspended resistance wire wherein the L/l ratio was not less than 0.9.

Starting from E11 as the closest prior art it was not obvious to replace a flat wire by a suspended wire and thereby to pay attention to the L/l ratio for improving the electric characteristics and reliability.

VIII. The opponents 1 and 2 argued in summary the following:

(a) Admissibility of auxiliary requests 2 to 9 and 2a and 9a

Auxiliary requests 2 to 9 were late-filed as they could have been filed earlier, namely with the grounds of appeal. Further, the auxiliary requests were prima facie not allowable and did not reflect a converging approach. Auxiliary requests 2a and 9a were filed only during the oral proceedings and thus were filed too late.

(b) Main request

The subject-matter of claim 1 lacked novelty in view of the disclosure in E1, E2, E10a, E11 and E31, since the term "spanned" did not exclude that the electric resistance wire lay flat on the electroconductive pins.

(c) Auxiliary request 1

The wording of claim 1 of auxiliary request 1 lacked clarity, since the skilled person did not know how to interpret the vague and relative term "extremely thin wire".

(d) Auxiliary request 2

The subject-matter of claim 1 constituted an unallowable intermediate generalisation of paragraph

[0025] as originally filed and did not fulfil the requirements of Article 123(2) EPC.

(e) Auxiliary request 2a

Starting from E1, E10a or E11 as the closest prior art the objective technical problem was the provision of an alternative. E28 to E30 demonstrated that initiators with a suspended wire were known in the art.
Arbitrarily replacing a flat wire by a suspended wire came within routine modifications by the skilled person.

(f) Auxiliary request 3

Claim 1 contained the same unclear feature (extremely thin wire) as claim 1 of auxiliary request 1. The addition of a further feature, which was independent from the unclear term, did not render the claim any clearer.
Auxiliary request 3 was prima facie not allowable.

(g) Auxiliary requests 4 and 5

Claim 1 contained the same unclear feature (extremely thin wire) as claim 1 of auxiliary request 1 and therefore was prima facie not allowable.

(h) Auxiliary requests 6

Claim 1 did not define that the wire was suspended. Therefore the same arguments with respect to novelty applied as for the main request.

(i) Auxiliary request 7

The subject-matter of claim 1 of auxiliary request 7 was obvious when starting from E10a or E11 as the closest prior art. Adjusting the welding distance to achieve a ratio of L/l of not less than 0.9 was done by the skilled person within experimental routine activities, in particular since it was described in E1 as being advantageous.

(j) Auxiliary request 9

Claim 1 of auxiliary request 9 contravened the requirements of Article 123(2) EPC for the same reasons as claim 1 of auxiliary request 2. Therefore this request was prima facie not allowable.

(k) Auxiliary request 9a

The subject-matter of claim 1 constituted an unallowable intermediate generalisation of paragraph [0025] as originally filed and did not fulfil the requirements of Article 123(2) EPC.

The wording of claim 1 was unclear, contrary to the requirements of Article 84 EPC.

The skilled person was not enabled by the contested patent to achieve a ratio of L/l of not less than 0.9. Therefore the subject-matter of claim 1 did not fulfil the requirements of Article 83 EPC.

The subject-matter of claim 1 of auxiliary request 9a lacked inventive step when starting from E11 or E10a.

(l) Substantial procedural violation

The right to be heard had been violated by the opposition division by not discussing sufficiency of disclosure for auxiliary request 3 (auxiliary request 1 of the appeal proceedings). Furthermore, the appealed decision was insufficiently reasoned in this aspect.

IX. Opponent 3 did not actively participate in the appeal proceedings.

Reasons for the Decision

1. **Main request**

Article 54 EPC

1.1 It is undisputed that an electric type initiator according to the introductory part of the main request having two electroconductive bodies electrically connected to each other through an electric resistance wire and an insulating body provided between these electroconductive bodies is described in documents E1, E2, E10a, E11 and E31.

1.2 Crucial for the evaluation of novelty is the interpretation of the term "spanned" in feature 1d) and the meaning of feature 1g) defined in claim 1.

1.2.1 Interpretation of the term "spanned"

According to the proprietor the term "spanned" in feature 1d) has the same meaning as the term

"suspended" and has to be interpreted as defining a kind of raised connection, distanced from the surface of the pins, like a bridge on supports spanning a valley. This interpretation would be in line with paragraph [0027] of the contested patent.

However, the wording in paragraph [0027] does not limit the claim which is independently defined by its own wording.
The wording of the claim is itself clear and there is no need to read further meaning from the description, in particular paragraph [0027].
The Board considers that the term "spanned" in its broadest meaning only indicates that something reaches or extends over or across. The term "spanned" therefore includes the option that something simply extends over to something else; so, for example, a pontoon bridge can span a river while at the same time touching the water. Any further limitation implied by the proprietor (spanned = suspended above a surface) is not reflecting the generally accepted meaning of the words used in the claim.

The Board therefore reaches the conclusion that the term "wire spanned between" does not exclude an arrangement wherein the wire touches the electroconductive bodies in the unwelded area.

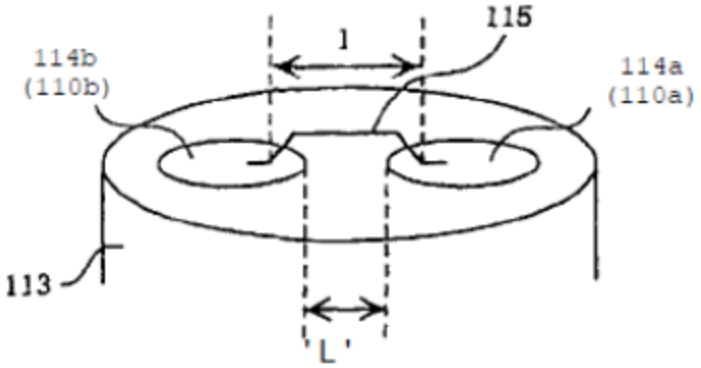
This interpretation is consistent with the limitations defined in feature 1g) of claim 1 as discussed in the following.

1.2.2 Interpretation of feature 1g) of claim 1

Claim 1 distinguishes between a distance L and a distance l. The distance L is defined as a "distance

between the surfaces to which the bridge wire 15 is connected", see paragraph [0024] of the contested patent. The distance l is defined as "a horizontal distance between the parts where the bridge wire 15 contacts two electroconductive bodies", see paragraph [0023] of the contested patent.

Both distances are shown in Figure 4 of the contested patent:



When the welding joints are directly at the edge of the electroconductive bodies (114a, 114b) at the closest point, the two distances l and L are clearly the same.

The contested patent further explicitly states in paragraph [0030] that "the longest distance (L) of the electric insulating body 13 is equal to the horizontal distance (l) of the portion which determines the resistance value of the electric resistance wire 15".

Therefore, it is explicitly stated in the contested patent that the distances l and L can be the same and, therefore, the option L/l = l is also covered by feature 1g of claim 1.

1.3 Taking into account the above interpretations of claim 1, the Board comes to the conclusion that the decision of the opposition division concerning novelty of the main request vis-à-vis E1 was correct for the following reasons.

1.3.1 E1 discloses in figures 1 to 4 and paragraphs 7 to 12 (page/line numbers referring to the translation):

- an electric type initiator (blasting cap) comprising two electroconductive bodies (lead pins 2, page 4, line 27),
- an insulating body (1, page 4, line 26) provided between top portions of the electroconductive bodies, and
- an electric resistance wire (4, page 4, line 37) between the top portions (21) of the electroconductive bodies which are exposed from an upper end portion of the insulating body ("bridge wire welded to the top portions").

Therefore the electric resistance wire (4) spans the two electroconductive bodies (2).

The top portions of the two electroconductive bodies are arranged to be flush with an upper end surface of the electric insulating body (figures).

The welding is carried out with an electrode that protrudes over the edge of the lead pin, thereby creating a weld from the edge of the pin towards its center (page 5, lines 1 to 4, figures 3 and 4).

As a consequence, the horizontal distance (l) becomes equal to the distance (L) between the top portions of

the two electroconductive bodies, and hence, the ratio L/l is 1, i.e. is not less than 0.8.

Consequently, the initiator according to claim 1 of the main request is known from E1.

1.4 E11 refers to an analysis of an airbag comprising an initiator from the company Special Devices Incorporated (SDI).

The proprietor has not questioned that the initiator described by E11 was publicly available before the priority date of the contested patent. The Board also accepts that the initiator of E11 forms prior art under Article 54(2) EPC.

Pictures 15 to 20 of E11 disclose an electric type initiator comprising an insulating body provided between top portions of the electroconductive bodies, and an electric resistance wire spanned between the top portions of the electroconductive bodies which are exposed from an upper end portion of the insulating body, and the top portions of the two electroconductive bodies arranged to be flush with an upper end surface of the electric insulating body.

Picture 20 of E11 also clearly demonstrates that the end points of the wire are welded to the electroconductive bodies (feature 1h)) and that the wire is spanned.

Picture 20 of E11 is a SEM picture and not a schematic drawing. Therefore dimensions can be derived therefrom. As demonstrated by the measurements of the opponents indicated in picture 20 of E11 the ratio L/l is 0.867.

Consequently, the initiator according to claim 1 of the main request is also known from E11.

1.5 The Board therefore comes to the conclusion that the main request is not allowable, since it lacks novelty over E1 or E11.

2. Auxiliary request 1

Article 84 EPC

2.1 Feature 1i'') of claim 1 refers to an "extremely thin wire". The term "extremely thin wire" was not present in the claims as granted but has been introduced from the description. Therefore the Board is in the position to discuss clarity issues arising from amendments based on this feature.

2.2 A generally accepted definition of an "extremely thin wire" does not exist. The Board further observes that the expression "extremely thin wire" is relative and indicates that the wire is thinner then usual due to the term "extremely".

The contested patent does not indicate how much thinner than usual the "extremely thin" wire has to be.

Therefore it is unclear to the skilled person which wire thickness is meant by said expression.

2.3 The expression "extremely thin wire" is used in combination with a further functional definition ("when a current is applied to the electric resistance wire, the suspended portion touches either one or both of the electroconductive bodies to change the resistance value of the electric resistance wire”).

This functional definition is however also vaguely defined, since it is not indicated at which current (e.g. 1mA or 10A) applied in which time (e.g. 1ms or 1s) the effect has to occur.

The current is also not the conventional current used for igniting the igniting powder but might be any unintentional static electricity (see paragraphs [0006] and [0028] of the contested patent).

Hence the skilled person cannot determine whether or not an initiator falls within the scope of claim 1 since a generally accepted definition of an "extremely thin wire" does not exist and the intended functionality cannot be determined in the absence of a defined current.

Therefore the Board reaches the conclusion that feature 1'') introduced into the wording of claim 1 as granted is unclear. Claim 1 of auxiliary request 1 therefore does not fulfil the requirements of Article 84 EPC.

3. Auxiliary request 2

3.1 Admissibility

The opponents argued that auxiliary request 2 had to be considered as a fresh case, and therefore should be excluded from the proceedings by the Board when exercising its discretion under Rule 12(4) RPBA. Moreover, the subject-matter of claim 1 did not converge when compared to claim 1 of auxiliary request 1.

The proprietor submitted auxiliary requests 2 and 3 with the response to the opponents' grounds for appeal,

which were thus filed at the earliest possible time once the proprietor knew the arguments presented by opponents 1 and 2 in support of their respective appeals; hence they have not been filed late nor can they be considered as an abuse of procedure.

The subject-matter of claim 1 of auxiliary request 2 in principle relates to the same subject-matter as claim 1 of the main request and auxiliary request 1 and does not diverge considerably.

The Board therefore does not make use of its discretion to hold auxiliary request 2 inadmissible.

3.2 Article 123(2) EPC

Claim 1 is based on claim 1 as filed wherein feature 1j) based on claim 6 as originally filed and feature 1i') mentioned in paragraph [0025] are added.

Feature 1i') is disclosed in paragraph [0025] in a sentence which reads:

"In other words, the end portions of the electric resistance wire such as the bridge wire 15 spanned between two electroconductive bodies (10a - 12) are generally welded to the respective electroconductive bodies (10a, 12), and thereby, a portion (that is, l - L) of the electric resistance wire which is not welded to the electroconductive bodies is suspended."

Therefore feature 1i') is originally disclosed in combination with the condition that the end portions of the wire are welded to the pins (feature 1h). An embodiment wherein the wire extends substantially beyond the welding point in the direction opposite to

the suspended wire bridge is not taught by the application as filed whereas claim 1 of auxiliary request 2 encompasses this embodiment.

The teaching of claim 1 therefore extends beyond the teaching of the application as originally filed.

3.3 The Board therefore concludes that claim 1 of auxiliary request 2 does not fulfil the requirements of Article 123(2) EPC.

4. Auxiliary request 2a

4.1 Admissibility

The proprietor submitted auxiliary request 2a during the oral proceedings before the Board.

The opponents argued that auxiliary request 2a was filed too late.

The Board considers that adding a feature, which the opponents argued had been omitted from the corresponding basis in the application as filed, cannot then come as a surprise to the opponents and cannot be regarded as an abuse of the procedure.

The Board therefore admits auxiliary request 2a by exercising its discretion under Article 13(3) RPBA.

4.2 Article 56 EPC

4.2.1 The Board agrees with the opponents that E11 forms a suitable starting point for the assessment of inventive step, which was not contested by the proprietor.

E11 refers to an analysis of an airbag comprising an initiator from the company Special Devices Incorporated (SDI), see point 1.4 above.

Feature 1j) of claim 1 defines that the initiator has to comply with a standardized test for evaluating the electrical stability (method 205 of MIL standard 1512).

This feature defines a tolerance level for the static discharge sensitivity (in this case: the tolerated change of the resistance value is set to 10%). Therefore, the desired level of electric stability expressed by feature 1j) simply defines the desired result to be achieved by the claimed initiator.

Since all initiators in airbags on the market should be electrically stable and E11 concerns airbags that are for sale, it can be assumed that the requirement of feature 1j) must be implicitly met by the initiator disclosed in E11.

Pictures 15 to 20 show the electroconductive bodies and the bridge wire from a top view, wherefrom it is however impossible to determine whether or not the wire is suspended.

The pictures presented by the opponents therefore do not demonstrate that the wire is suspended.

4.2.2 The subject-matter of claim 1 differs from the disclosure of E11 in that a portion (l - L) of the electric resistance wire which is not welded to the electroconductive bodies is suspended (feature 1i')).

4.2.3 The main aim of the contested patent is to provide an electrically stable initiator (paragraph [0007]). This

problem is undisputedly solved by an initiator having a flat bridge wire as disclosed in E11.

The proprietor submitted that various advantages can be achieved by using a suspended wire such as better ignition, higher resistance value of the wire and less tensioning of the wire.

However, none of these advantages is demonstrated or even mentioned in the contested patent.

Therefore these advantages are unproven allegations which cannot be derived from the contested patent and cannot be taken into account for determining the objective technical problem (Case Law of the Boards of Appeal, 8th edition, 2016, Chapter I.D.4.2 and I.D. 4.3.2).

4.2.4 The objective technical problem can therefore be formulated as to provide an alternative initiator.

4.2.5 In general there are two possible alternatives available in the art for arranging the bridge wire on electroconductive bodies, either suspended or unsuspended (and therefore flat).

Both alternatives and their respective commonly known characteristics are known in the art as evidenced for a flat wire by E1 (figures 1 and 3) and for a suspended wire by E28 (figures 2 to 5), E29 (figure 1) and E30 (figures 1 and 2).

Replacing one alternative arrangement (flat wire) by the known second alternative (suspended wire) comes within the experimental routine of the skilled person. Thereby no practical difficulties are to be expected.

4.2.6 The Board therefore reaches the conclusion that claim 1 of auxiliary request 2a does not fulfil the requirements of Article 56 EPC.

5. Auxiliary request 3

5.1 Admissibility

The term "extremely thin wire" in claim 1 of auxiliary request 3 has been demonstrated to be unclear, see above with respect to auxiliary request 1.

The further feature 1j) does not remedy this deficiency. The test described in feature 1j) is independent from feature 1i''), since no hint can be found in claim 1 that the current in feature 1i'') has to be the current used in the MIL standard test. On the contrary, the current addressed in feature 1i'') can be any static current which can be applied for any time span.

Therefore auxiliary request 3 prima facie does not fulfil the requirement of Article 84 EPC for the same reasons as auxiliary request 1, and is not admitted into the proceedings by the Board in exercise of its discretion under Article 12(4) RPBA.

6. Auxiliary requests 4 and 5

Admissibility

The term "extremely thin wire" in claim 1 of auxiliary requests 4 and 5 has been demonstrated to be unclear, see above with respect to auxiliary request 1.

The further feature 1k) added to the claim refers to the arrangement of the electroconductive bodies and therefore does not clarify the thickness of the wire.

Therefore auxiliary requests 4 and 5 prima facie do not fulfil the requirement of Article 84 EPC for the same reasons as auxiliary request 1 and are therefore not admitted into the proceedings by the Board in exercise of its discretion under Article 12(4) RPBA.

7. Auxiliary Request 6

Admissibility

As discussed above in point 1.4, an initiator comprising features 1a) to 1g) having a spanned resistance wire is known from E11.

The further feature 1k) refers to the arrangement of the electroconductive bodies in an eyelet arrangement.

The additional feature is clearly disclosed by E11. As can be seen from figures 7 to 14 as well as the figures shown on pages 19 to 22 of E11, the initiator comprises a first (inner) electroconductive pin and a metallic eyelet with an opening adapted to receive the first electroconductive pin. As can be further seen from e.g. figure 9 of E11, the metallic eyelet is connected to a second electroconductive pin.

Further, an insulating body is introduced into the opening by means of which the first electroconductive pin and the metallic eyelet are isolated from each other.

Hence, auxiliary request 6 prima facie does not fulfil the requirement of Article 54 EPC and is therefore not admitted into the proceedings by the Board in exercise of its discretion under Article 12(4) RPBA.

8. Auxiliary Request 7

8.1 Admissibility

The proprietor submitted auxiliary request 7 with the response to the opponents' grounds for appeal.

Therefore in principle the same reasoning as for auxiliary request 2 applies.

The Board therefore does not make use of its discretion not to admit auxiliary request 7 into the proceedings.

8.2 Article 56 EPC

8.2.1 Claim 1 defines an initiator in an eyelet arrangement wherein the bridge wire is spanned between the electroconductive bodies.

8.2.2 E11 discloses an initiator having an eyelet arrangement (see figure 7 to 15 as well as the figures shown on pages 19 to 22 of E11) and therefore is a suitable starting point for assessing inventive step.

8.2.3 E11 discloses an initiator having a spanned resistance wire wherein the ratio L/l is 0.867 (see point 1.4 above).

8.2.4 The subject-matter of claim 1 of auxiliary request 7 therefore differs from the initiator of E11 in that the ratio L/l is not less than 0.9.

8.2.5 In the examples of the contested patent it is demonstrated that in the case of a suspended wire, the ratio L/l has an impact on the electric stability.

However, when - as is defined in claim 1 - the wire is simply spanned (see interpretation of feature 1d) in point 1.2.1 above) and lies flat on the electroconductive bodies, the electric resistance does not change when a current is applied, since the wire touches already the electroconductive bodies.

Therefore the contested patent does not demonstrate any advantage or surprising effect for using an initiator having a ratio L/l of not less than 0.9 in comparison to a similar initiator as disclosed by E11 having a ratio of L/l of 0.867.

8.2.6 The objective technical problem can therefore be regarded as to provide an alternative.

8.2.7 Arbitrarily adjusting the distance of the welding spots comes within the customary practice of the skilled person when aiming at the provision of a simple alternative. Since the difference in the positioning of the welding spots required to achieve a ratio L/l is so marginal, no technical difficulties are expected when arbitrarily placing the welding spots slightly closer to the rim.

8.2.8 Therefore the Board reaches the conclusion that the subject-matter of claim 1 of auxiliary request 7 lacks an inventive step.

9. Auxiliary Request 8

Admissibility

As discussed above with respect to auxiliary request 2a an initiator comprising features 1a) to 1g) and 1i') is obvious when starting from E11 (see point 4.2 above).

The further feature 1k) refers to the arrangement of the electroconductive bodies in an eyelet arrangement.

The additional feature is clearly disclosed by E11 as discussed above with respect to auxiliary requests 6 and 7 and does not represent a further difference.

Therefore auxiliary request 8 prima facie does not fulfil the requirement of Article 56 EPC for the reasons discussed above with respect to auxiliary request 2a and is therefore not admitted into the proceedings by the Board exercising its discretion under Article 12(4) RPBA.

10. Auxiliary Request 9

10.1 Admissibility

Concerning the admissibility of auxiliary request 9 the same arguments apply as for auxiliary request 2.

The Board therefore does not make use of its discretion to hold auxiliary request 9 inadmissible when exercising its discretion under Article 12(4) RPBA.

10.2 Article 123(2) EPC

Claim 1 defines an initiator which is defined by feature 1i') in the absence of feature 1h).

Therefore the subject-matter of claim 1 of auxiliary request 9 does not fulfil the requirement of Article 123(2) EPC for the same reasons as claim 1 of auxiliary request 2.

11. Auxiliary Request 9a

11.1 Admissibility

The Board admits auxiliary request 9a in exercise of its discretion under Article 13(3) RPBA for the same reasons as for auxiliary request 2a.

11.2 Article 123(2) EPC

11.2.1 Claim 1 is based on the combination of claims 1, 3 and 10 as filed. Furthermore, features 1h) and 1i') have been added, as mentioned in paragraph [0025] of the application as filed (reference is made to the A-publication in the following) which reads:

"In other words, the end portions of the electric resistance wire such as the bridge wire 15 spanned between two electroconductive bodies (10a - 12) are generally welded to the respective electroconductive bodies (10a, 12)," (basis for feature 1h)) "and thereby, a portion (that is, 1 - L) of the electric resistance wire which is not welded to the electroconductive bodies is suspended." (basis for feature 1i')) "Further, the electric resistance wire is formed of an extremely thin wire, and thereby, when a

current is applied to the electric resistance wire (15), the suspended portion touches either one or the both of the electroconductive bodies (10a or 12) to change the resistance value of the electric resistance wire (15)." (basis for feature 1i'')).

11.2.2 In paragraph [0025] features 1h) and i') are linked by the expression "and thereby" which is not part of claim 1.

The question arises whether the expression "and thereby" implies that the suspended portion has to be a result of the welding process as argued by the opponents or whether it has to be read as "and at the same time" or "and while doing so".

The Board observes that the application as originally filed describes throughout the description that the wire is attached to the pins by welding (see for example also paragraph [0021]). An explicit teaching that the suspension of the wire is directly a result of a welding process cannot be found in the remaining application as filed.

The technical teaching of paragraph [0025] implies that once the wire has been welded to the conductive bodies, the wire is suspended. Whether the wire is thereby suspended due to a specific shape of the wire which is simply fixed by a welding step or due to the fact that the wire is simply not tensioned during the welding step is not defined. It is also not described that a straight wire inevitably becomes a suspended wire due to the welding process.

Therefore the Board comes to the conclusion that the technical teaching in paragraph [0025] of the

application as filed is as unspecific as the technical teaching of claim 1.

11.2.3 The opponents argued that the teaching of the second sentence of paragraph [0025] (feature 1'') of claim 1 was inevitably linked to the first sentence and therefore claim 1 constituted an intermediate generalisation of the teaching of paragraph [0025] as originally filed.

The Board considers that the choice of a wire having a certain thickness is independent from the arrangement of the wire (flat or suspended). Therefore the choice of an "extremely thin wire" is not a condition for achieving a suspended electric resistance wire.

Furthermore, the remaining description does not teach that the electric resistance wire has to touch the pins once a current is applied. On the contrary the main aim of the application as filed is to provide an initiator having electrically stable properties which is clearly teaching away from an embodiment where the wire could touch the pins in an uncontrolled manner when applying any type of current.

The features of the first sentence in paragraph [0025] are therefore not inevitably linked to the embodiment described in the second sentence.

11.2.4 In summary, the Board concludes that the claims of auxiliary request 9a fulfil the requirements of Article 123(2) EPC.

11.3 Article 84 EPC

11.3.1 The opponents argued that the terms "suspended" and "a portion .... suspended" introduced into claim 1 as granted were unclear as the patent would not give an explanation of these terms.

The Board however concludes that the self-explaining terms "suspended" and "a portion" are used in claim 1 in their usual meaning (to suspend = to hang from somewhere; a portion = a part or fragment). This interpretation of the terms in line with their generally accepted meaning is confirmed by the figures of the contested patent. Therefore the skilled person has no doubts how to interpret the terms "suspended" and "a portion ... suspended" in claim 1.

11.3.2 The opponents further argued in line with point 12 of the impugned decision that a lack of clarity is introduced by the addition of the feature 1i'), since feature 1i') is contradictory to the requirements implied by feature 1g) and 1h) in case L/l = 1.0, since a portion (l-L) does not exist in this case and thus could not be suspended.

In the Board's view claim 1 comprises several features which all need to be respected.
A general definition (L/l not less than 0.9) is limited by further features, namely a portion (l-L) is not welded and is suspended, and both of these features are to be considered. In the present case this leads to the conclusion that the possible option L/l = 1 of the broader definition is simply excluded by further defining that a portion (l-L) not welded is present and is suspended.

11.3.3 Therefore the Board cannot determine any lack of clarity in the wording of claim 1 and therefore concludes that the claims of auxiliary request 9a fulfil the requirements of Article 84 EPC.

11.4 Article 83 EPC

11.4.1 "ratio L/l not less than 0.9"

The opponents argued that the skilled person is not enabled by the contested patent to produce an initiator wherein the wire is welded in a position that the ratio L/l is not less than 0.9.

In this context they point out that the contested patent does not describe any example wherein the ratio L/l is 0.9 or higher. Furthermore they argue that E1 indicates in paragraph [0005] that it is difficult to bring a pair of welding electrodes into close contact.

Turning to E1 it is observed by the Board that E1 does not indicate in paragraph [0005] that it is impossible to weld a bridge wire so close to the edge of the electroconductive bodies, but only states that it is difficult. Thus E1 does not support the allegation of the opponents.

There is evidence for commercially available initiators having a L/l ratio of above 0.8, such as 0.867 in the case of E11 or 0.89 in the case of E10a.
No argument has been provided by the opponents why it was possible to produce a ratio L/l of 0.867 or even 0.89 on a large industrial scale, but would be impossible to produce the same initiator with a slightly increased ratio of 0.9 or more.

Hence the opponents have not rendered it plausible that the skilled person is unable to reproduce the initiator proposed by the contested patent.

The Board therefore comes to the conclusion that auxiliary request 9a fulfils the requirement of Article 83 EPC.

11.5 Article 54 EPC

11.5.1 Claim 1 defines an initiator in an eyelet arrangement wherein the bridge wire is suspended between the electroconductive bodies.

None of documents E1, E2, E10a and E31, which were used by the opponents to argue that claim 1 of the main request lacked novelty, discloses an initiator having an eyelet arrangement.

11.5.2 However, E11 discloses an initiator having an eyelet arrangement and comprising a spanned resistance wire (see discussion in points 1.4 and 7 above).

The opponents argue that the ratio L/l of 0.867 disclosed for the initiator analysed in E11 has to be rounded up and is thus 0.9.
Moreover, the difference between "not less than 0.9" and "0.867" is so marginal that during conventional manufacturing processes initiators with the required ratio had been inevitably produced.

The Board observes that claim 1 explicitly defines that the ratio L/l is "not less than 0.9" and therefore does not include any ratio below 0.9.
Therefore the argument that 0.867 is the same as 0.9 when rounded is not persuasive.

In the absence of any proof that one of the further initiators sold and delivered together with the initiator described in E11 falls within the definition of claim 1, the opponents have not established that E11 discloses an initiator having a ratio L/l of not less than 0.9.

Hence, the subject-matter of claim 1 of auxiliary request 9a differs from the initiator of E11 in that
- a portion (l - L) of the electric resistance wire which is not welded to the electroconductive bodies is suspended and
- the ratio L/l is not less than 0.9.

The Board therefore comes to the conclusion that auxiliary request 9a fulfils the requirement of Article 54 EPC.

11.6 Article 56 EPC

11.6.1 E11 is a suitable starting point for assessing inventive step as already argued with respect to claim 1 of auxiliary requests 2a and 7 (see points 4.2.1 and 8.2.2).

11.6.2 The subject-matter of claim 1 of auxiliary request 9a differs from the initiator of E11 in that
- a portion (l - L) of the electric resistance wire which is not welded to the electroconductive bodies is suspended and
- the ratio L/l is not less than 0.9.

11.6.3 As discussed above in the context of auxiliary request 2a (see point 4.2.3 above), the contested patent does not describe an effect when changing from a flat wire

to a suspended wire. Also no effect has been shown for choosing a L/l ratio of not less than 0.9 when considering a flat wire.

11.6.4 The objective technical problem can therefore be formulated as to provide an alternative initiator.

In replacing one known wire arrangement (i.e. flat wire) by the known second alternative (i.e. suspended wire), the skilled person could simply keep the welding distance as derived from E11 or he could change it.

Regarding a change in the welding distance, there is no information in E11 as to how to arrange the welding points. In other words, E11 does not provide any motivation to pay attention to the L/l ratio defined in claim 1 for an arrangement wherein the wire is suspended.

The examples of the contested patent do not show an embodiment wherein L/l is not less than 0.9. However, it still becomes evident from the experimental results shown in tables 1 and 2 that the ratio L/l has an impact on the electric stability of an initiator having a suspended wire.

Starting from the arrangement of E11 and changing the position of the welding points to be either closer or further apart therefore would have an impact on the electric stability when the wire is suspended.

Hence it cannot be concluded that the choice of the L/l ratio of being at least 0.9 is completely irrelevant for an initiator having a suspended electric resistance wire.

The importance of the L/l ratio on the electric stability however is not disclosed in any of the further documents in the proceedings, in particular also not in E1 cited by the opponents.

According to E1 the electric resistance wire lies flat on the electroconductive bodies. Therefore no problem in resistance stability exists for the igniter according to E1 and it would be contradictory to the technical idea of E1 to use a suspended wire, because E1 is directed to an igniter structure that excludes room between the wire and the conductive pin (paragraph [0005]).

For that reason, a person skilled in the art would not consider the teaching of E1 when aiming at a suspended electric resistance wire.

In summary, the importance of the ratio L/l in view of the influence on the electric stability of an initiator having a suspended bridge wire is not recognised in the closest prior art or any other document cited by the opponents. Consequently, when placing the welding points in a different position than that shown in the pictures of E11, it is not obvious for the skilled person, having decided to change the flat wire for a suspended one, to pay attention to the L/l ratio, even considering the teaching of E1. The skilled person would therefore not choose a L/l ratio of not less than 0.9 in accordance with claim 1 of auxiliary request 9a.

11.6.5 The opponents further argue that the subject-matter of claim 1 is obvious when starting from E10a, since only trivial modifications are required to arrive at the claimed initiator.

E10a refers to an analysis of an airbag comprising an initiator from the company EMS PATVAG.

Pictures 11 to 20 of E10a disclose an electric type initiator comprising two electroconductive bodies (two pin structure), an insulating body provided between top portions of the electroconductive bodies, and an electric resistance wire spanned between the top portions of the electroconductive bodies which are exposed from an upper end portion of the insulating body, and the top portions of the two electroconductive bodies arranged to be flush with an upper end surface of the electric insulating body (picture 17 in particular).

Picture 17 also clearly demonstrates that the end points of the wire are welded to the pins (feature 1h)). Based on the measurements in SEM pictures 19 and 20 of E10a the opponents have shown that the ratio L/l is 0.89.

However, the pictures presented by the opponents do not demonstrate with absolute certainty that the wire is suspended for the following reasons.

Pictures 12 to 16 and 18 to 20 show the electroconductive pins and the bridge wire from a top view. From a top view it is impossible to determine whether or not the wire is suspended.

It can however be seen from these pictures that the wire is slightly bend.

Picture 17 and the corresponding enlarged pictures E10b and E32 show the bridge wire and the pins from an angle which is a position that is not directly above. In the

enlarged print of picture 17 on A3 paper (E32) particles of the igniting powder can be seen. However, it cannot be determined clearly that the particles are underneath the wire, and in particular underneath the wire in the area of the electroconductive pins.

Therefore it cannot be said with certainty that the wire is suspended.

The Board further considers that the same level of accuracy has to be applied when determining the meaning of the terms "flush" and "suspended" in claim 1.

If it were concluded that a small gap between the wire and the insulator and between the wire and the surface of the electroconductive pins is visible at the level of magnification shown in E32 (enlarged print of picture 17 of E10a), then the unevenness of the surface of the insulating body and the elevation of the top surface of the electroconductive bodies above the surface of the insulating body would be observed too. The unevenness and elevation is at the same level or even higher than the possible distance between the wire and the insulating body and the pins.

Consequently, when considering that an elevation of the size of a single igniting powder particle is enough to "suspend" the bridge wire, then at this level of magnification it has to be concluded that the top portions of the two electroconductive bodies are not arranged to be flush with an upper end surface of the electric insulating body, since the electroconductive bodies do not appear to be in the same plane with the electric insulating body.

On the other side, when considering the top portions of the two electroconductive bodies in E32 as being arranged to be flush with an upper end surface of the electric insulating body in the context of an industrial manufacturing process, then at this level of accuracy the wire cannot be considered to be suspended.

The subject-matter of claim 1 of auxiliary request 9a therefore differs from the initiator disclosed in E10a in that the electric resistance wire is suspended, the initiator has an eyelet arrangement and the ratio L/l is not less than 0.9.

The eyelet structure according to claim 1 of auxiliary request 9a might be a well-known alternative to the two-pin structure used for the initiator according to E10a as argued by the opponents. However, it is not apparent why the skilled person starting from a commercially available initiator as described by E10a should not only completely rearrange the electroconductive pins to arrive at an eyelet structure but also change the arrangement of the electric resistance wire from a flat position to a suspended position and at the same time place the welding points closer together in order to respect the L/l ratio defined in claim 1.

In the absence of any clear pointer in E10a or in any other document, this amount of structural change cannot be seen as obvious for the skilled person.

11.6.6 The Board therefore concludes that claim 1 of auxiliary request 9a fulfils the requirement of Article 56 EPC.

12. Reimbursement of the appeal fee

The request for reimbursement of the appeal fee by the opponents 1 and 2 is based on the alleged substantial procedural violation committed by the opposition division in not discussing sufficiency of disclosure for auxiliary request 3 (auxiliary request 1 of the appeal proceedings) and by insufficiently reasoning this aspect in the decision.

According to point 2.1.6 of the minutes of the opposition oral proceedings the opposition division indicated an initial opinion for the main request regarding sufficiency of disclosure, and then opened the discussion under Article 83 EPC for auxiliary request 3. After a break, the division gave an initial opinion on the requirements of Article 83 EPC with respect to auxiliary request 3 after discussion with the parties (points 5.1.3 to 5.1.6 of the minutes).

According to the minutes the parties therefore had an opportunity to discuss sufficiency of disclosure for all requests during the oral proceedings.

Thus, the Board concludes that the right to be heard has not been violated in this aspect.

The Board further observes that the opposition division gave a reasoning on sufficiency of disclosure with respect to the main request (point 2 of the reasons).

Concerning auxiliary request 3, it is stated in point 17 of the appealed decision: "The general sufficiency of disclosure had been already accepted".

The opposition division considered the arguments concerning the term "extremely thin wire" in claim 1 of auxiliary request 3 to relate to sufficiency of disclosure (see point 17 on page 18 of the impugned decision), which had been already discussed in the framework of the main request. Consequently the division decided as a logical consequence that further discussion of a topic that had already been dealt with was not appropriate.

The decision is therefore sufficiently reasoned and, as the minutes show, the parties had been given an opportunity to discuss the point.

Therefore, the Board cannot see any reason to conclude that a substantial procedural violation was committed by the opposition division which could justify the reimbursement of the appeal fee.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the opposition division with the order to maintain the patent in amended form on the basis of claims 1 to 5 of auxiliary request 9a filed during the oral proceedings before the Board and a description and figures to be adapted thereto.

3. The request for reimbursement of the appeal fee is rejected.

The Registrar: The Chairman:

C. Spira G. Ashley

Decision electronically authenticated