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**Datasheet for the decision
of 17 May 2021**

Case Number: T 1142/18 - 3.5.02

Application Number: 13174895.6

Publication Number: 2648292

IPC: H01T4/12

Language of the proceedings: EN

Title of invention:

Gas discharge tube

Patent Proprietor:

Bourns, Inc.

Opponent:

Epcos AG

Relevant legal provisions:

EPC Art. 100(b), 83, 56

Keyword:

Main request, auxiliary requests Ia, I, II - insufficiency of disclosure (yes)

Auxiliary request III - Inventive step (yes)



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 1142/18 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 17 May 2021

Appellant: Bourns, Inc.
(Patent Proprietor) 1200 Columbia Avenue
Riverside, CA 92507 (US)

Representative: Kransell & Wennborg KB
P.O. Box 27834
115 93 Stockholm (SE)

Appellant: Epcos AG
(Opponent) St.-Martin-Str. 53
81669 München (DE)

Representative: Epping - Hermann - Fischer
Patentanwalts-gesellschaft mbH
Schloßschmidstraße 5
80639 München (DE)

Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
28 February 2018 concerning maintenance of the
European Patent No. 2648292 in amended form.**

Composition of the Board:

Chairman R. Lord
Members: C.D. Vassoille
J. Hoppe

Summary of Facts and Submissions

- I. The patent proprietor and the opponent have filed appeals against the interlocutory decision of the opposition division concerning European patent no. 2 648 292.
- II. In the decision under appeal, the opposition division came to the conclusion that the ground for opposition under Article 100(b) EPC prejudiced the maintenance of the patent as granted (main request). The then auxiliary request 1, submitted during the oral proceedings on 12 December 2017, was considered to fulfil the requirements of the EPC.
- III. The following documents are relevant for the present decision:
- D1: US 3 454 811
 - D2: JP H05-84007 U
 - D3: JP 2006-24423 A
 - D4: US 3 878 423
 - D6: EP 0 635 918 A2
 - D7: US 4 407 849
 - D8: EP 0 547 586 A2
 - D10: US 2 050 397
 - D11: US 1 933 329
 - D15: DE 2 3055 657
 - D21: JP 3 62485
 - D22: German translation of D21
- IV. The parties were summoned to oral proceedings. In a communication under Article 15(1) RPBA 2020 annexed to the summons, the board set out their preliminary

observations on the appeal, concluding *inter alia* that the maintenance of the patent as granted seemed to be prejudiced by the ground for opposition under Article 100(b) EPC and that the opposition division's finding on the then auxiliary request 1, as regards the assessment of added subject-matter and inventive step, seemed to be correct.

- V. Oral proceedings were held on 17 May 2021 in the presence of the parties by videoconference with the consent of the parties.

The appellant-patent proprietor (referred to in the following as patent proprietor) requested that the decision under appeal be set aside and that the patent be maintained as granted (main request), or as an auxiliary measure, that the patent be maintained on the basis of the claims of one of the following auxiliary requests in the given order:

- auxiliary request Ia filed with letter of 16 April 2021,
- auxiliary request I filed with letter of 14 June 2016,
- auxiliary request II filed with the same letter, i.e. to dismiss the opponent's appeal,
- auxiliary request III filed with letter of 23 November 2018.

The appellant-opponent (referred to in the following as opponent) requested that the decision under appeal be set aside and that the European patent be revoked.

- VI. Claim 1 of the patent as granted (proprietor's main request) reads as follows:

"Gas discharge tube comprising at least two electrodes (15, 16) and at least one hollow insulating ring (11) fastened to at least one of the electrodes (15, 16), **characterized in that** the hollow insulating ring (11) comprises a cylindrical part (12), from which a first radially extending flange (13) extends inwardly and/or a second radially extending flange (14) extends outwardly whereby the hollow insulating ring (11) has an extended length for a creeping current on at least one of the surfaces of at least one of said first and second radially extending flanges (13, 14) facing inward and outward respectively compared to the height of said insulating ring (11) thereby providing a long distance to any possible creeping current, whereby the hollow insulating ring (11) has a ratio between the total height h of the insulating ring (11) and the total length L for a creeping current on at least one of the surfaces of the at least one of said first and second radially extending flanges (13, 14) facing inward and outward respectively of $< 1:1.3$, whereby the ratio h to L is preferably $1:1.5$, preferably $1:2$, more preferably $1:2.5$, still more preferably $1:3$, and further preferably $1:5$, and whereby the ratio between h to w , wherein w is the width of the hollow insulator as defined as the distance between the outer edges of the first and second flanges (13, 14), is 1 to 3-10."

VII. Claim 1 of auxiliary request Ia reads as follows (amendments are marked with strike-through compared to the main request):

"Gas discharge tube comprising at least two electrodes (15, 16) and at least one hollow insulating ring (11) fastened to at least one of the electrodes (15, 16), **characterized in that** the hollow insulating ring (11) comprises a cylindrical part (12), from which a first

radially extending flange (13) extends inwardly and/or a second radially extending flange (14) extends outwardly whereby the hollow insulating ring (11) has an extended length for a creeping current on at least one of the surfaces of at least one of said first and second radially extending flanges (13, 14) facing inward and outward respectively compared to the height of said insulating ring (11) thereby providing a long distance to any possible creeping current, whereby the hollow insulating ring (11) has a ratio between the total height h of the insulating ring (11) and the total length L for a creeping current on at least one of the surfaces of the at least one of said first and second radially extending flanges (13, 14) facing inward and outward respectively of $< 1:1.3$, whereby the ratio h to L is preferably 1:1.5, preferably 1:2, more preferably 1:2.5, still more preferably 1:3, and further preferably 1:5, and whereby the ratio between h to w , wherein w is the width of the hollow insulator as defined as the distance between the outer edges of the first and second flanges (13, 14), is 1 to 3-10."

VIII. Claim 1 of auxiliary request I reads as follows (amendments are marked with strike-through compared to the main request):

"Gas discharge tube comprising at least two electrodes (15, 16) and at least one hollow insulating ring (11) fastened to at least one of the electrodes (15, 16), **characterized in that** the hollow insulating ring (11) comprises a cylindrical part (12), from which a first radially extending flange (13) extends inwardly and/or a second radially extending flange (14) extends outwardly whereby the hollow insulating ring (11) has an extended length for a creeping current on at least one of the surfaces of at least one of said first and

second radially extending flanges (13, 14) facing inward and outward respectively compared to the height of said insulating ring (11) thereby providing a long distance to any possible creeping current, whereby the hollow insulating ring (11) has a ratio between the total height h of the insulating ring (11) and the total length L for a creeping current on at least one of the surfaces of the at least one of said first and second radially extending flanges (13, 14) facing inward and outward respectively of $< 1:1.3$, ~~whereby the ratio h to L is preferably $1:1.5$, preferably $1:2$, more preferably $1:2.5$, still more preferably $1:3$, and further preferably $1:5$, and whereby the ratio between h to w , wherein w is the width of the hollow insulator as defined as the distance between the outer edges of the first and second flanges (13, 14), is 1 to 3-10.~~"

IX. Claim 1 of auxiliary request II reads as follows (amendments are marked with strike-through compared to the main request):

"Gas discharge tube comprising at least two electrodes (15, 16) and at least one hollow insulating ring (11) fastened to at least one of the electrodes (15, 16), **characterized in that** the hollow insulating ring (11) comprises a cylindrical part (12), from which a first radially extending flange (13) extends inwardly and/or a second radially extending flange (14) extends outwardly whereby the hollow insulating ring (11) has an extended length for a creeping current on at least one of the surfaces of ~~at least one of~~ said first and second radially extending flanges (13, 14) facing inward and outward respectively compared to the height of said insulating ring (11) thereby providing a long distance to any possible creeping current, whereby the hollow insulating ring (11) has a ratio between the

total height h of the insulating ring (11) and the total length L for a creeping current on at least one of the surfaces of ~~the at least one of~~ said first and second radially extending flanges (13, 14) facing inward and outward respectively of $< 1:1.3$, whereby the ratio h to L is preferably $1:1.5$, preferably $1:2$, more preferably $1:2.5$, still more preferably $1:3$, and further preferably $1:5$, and whereby the ratio between h to w , wherein w is the width of the hollow insulator as defined as the distance between the outer edges of the first and second flanges (13, 14), is 1 to 3-10."

- X. Claim 1 of auxiliary request III reads as follows (amendments are marked with strike-through compared to the main request):

"Gas discharge tube comprising at least two electrodes (15, 16) and at least one hollow insulating ring (11) fastened to at least one of the electrodes (15, 16), **characterized in that** the hollow insulating ring (11) comprises a cylindrical part (12), from which a first radially extending flange (13) extends inwardly and/or a second radially extending flange (14) extends outwardly whereby the hollow insulating ring (11) has an extended length for a creeping current on ~~at least one of~~ the surfaces of ~~at least one of~~ said first and second radially extending flanges (13, 14) facing inward and outward respectively compared to the height of said insulating ring (11) thereby providing a long distance to any possible creeping current, whereby the hollow insulating ring (11) has a ratio between the total height h of the insulating ring (11) and the total length L for a creeping current on ~~at least one of~~ the surfaces of ~~the at least one of~~ said first and second radially extending flanges (13, 14) facing inward and outward respectively of $< 1:1.3$, whereby the

ratio h to L is preferably 1:1.5, preferably 1:2, more preferably 1:2.5, still more preferably 1:3, and further preferably 1:5, and whereby the ratio between h to w , wherein w is the width of the hollow insulator as defined as the distance between the outer edges of the first and second flanges (13, 14), is 1 to 3-10."

Claims 2 to 15 are dependent on claim 1.

XI. The arguments of the patent proprietor as far as they are relevant for the present decision are as follows:

The issue of sufficiency of disclosure was an issue of claim interpretation. The claim should be interpreted with a mind willing to understand and in particular, all features of claim 1 should be read together. Only misinterpretation in the current case led to the result that the invention of claim 1 of the main request could not be put into practice. Claim 1 should not be interpreted as globally preventing any creeping current but only the creeping current on the flange of the particular embodiment. This followed from the expression "thereby" preceding the wording "providing a long distance to any possible creeping current". Furthermore, it was clear that the "extended length for a creeping current" was a consequence of the flange and thus, an extended length in the sense of claim 1 did not exist without a flange.

Figures 6 and 7 of the patent under appeal disclosed embodiments of a hollow insulating ring comprising a cylindrical part, from which only one flange was radially extending. It was further clear from paragraph [0007] of the patent under appeal that a coating could be applied on the surface of the hollow insulating ring not having a radially extending flange. Reference was

further made to paragraph [0018] of the patent under appeal, which disclosed that a radially outwardly extending flange may be omitted under certain conditions.

As regards the opponent's objection under Articles 100(b) and 83 EPC, similar arguments applied to auxiliary requests Ia and I.

As regards auxiliary request II, claim 1 explicitly defined a first radially extending flange extending inwardly and a second radially extending flange extending outwardly. Contrary to the opponent's argument, an extended length was consequently provided on the inwardly extending flange as well as on the outwardly extending flange. The requirement of Article 83 EPC was therefore met.

Documents D21 and D22 should not be admitted into the appeal procedure because these documents were late filed and not *prima facie* relevant. The opposition division was therefore right to not admit them into the opposition procedure and they were therefore not to be admitted into the appeal procedure.

Auxiliary request III should be admitted into the appeal procedure, because filing of it with the reply to the opponent's appeal constituted a legitimate reaction to the new argument raised by the opponent in their grounds of appeal in the paragraph bridging pages 4 and 5, relating to the wording "at least one of the surfaces" in claim 1 of auxiliary request II. Filing of auxiliary request III was an immediate reaction to this new argument and could therefore not have been filed earlier. It was consequently to be admitted into the appeal procedure.

The subject-matter of claim 1 of auxiliary request III involved an inventive step, in particular in view of a combination of document D2 with D6. Instead of D2, reference was made in this context to US 5,931,961, which was a family member of D2. The drawings of document D2, representing the closest prior art document, were purely of a schematic nature and not to scale. The ratios of h to L and h to w as defined in claim 1 could therefore not be derived from D2. Similar arguments applied to the further documents D1, D3 and D4. Furthermore, the technical effect of the claimed ratio h to L of $< 1:1.3$ was not only the prevention of creeping currents but also the provision of a flatter gas discharge tube. The objective technical problem could be formulated as how to modify the gas discharge tube of D2 such as to avoid a creeping current. None of the prior art documents disclosed or hinted towards an h to L ratio of $< 1:1.3$. To the contrary, the prior art documents suggested other solutions, such as the provision of several flanges or improving shadowing against sputtering. Furthermore, the skilled person when starting from D2 and faced with the objective technical problem would at best provide a further flange as disclosed in column 5, lines 12 to 16 of D2, but would not go against this explicit teaching and extend one flange by routine experiments or simulations as alleged by the opponent. It was further clear from claim 1 of auxiliary request III that the extended length for a creeping current was a consequence of the provision of a single flange and not of several flanges. It was further to be noted that the skilled person would be discouraged from extending the flange 7 of document D2 (see in particular figure 1) because an extended flange would interfere with the discharge electrode portions 4b, 4b'. Positioning an extended

flange between the electrode portions 4b and 4b' would disturb the electric field between the discharge electrode portions and the skilled person would therefore not consider an extension of the radially inwardly extending flange 7 between the electrode portions.

XII. The arguments of the opponent as far as they are relevant for the present decision are as follows:

Claim 1 of the main request contained three embodiments, namely two embodiments having only one flange and another embodiment having two radially extending flanges. It was clear from the overall wording of claim 1 that the expression "any possible creeping current" referred to any of these embodiments and thus also referred to the embodiments having only one radially extending flange, either on the inside or on the outside of the hollow insulating ring. Reference was made to the case law of the boards of appeal (see Case Law of the Boards of Appeal, ninth edition 2019, II.C.5.4), according to which sufficiency of disclosure presupposed that the skilled person should be able to implement all embodiments falling within the ambit of the claim and that this principle applied to any invention irrespective of the way in which it was defined, be it by way of a functional feature or not. For an embodiment having only one flange on the inside or on the outside, it was not possible to put the invention into practice, because "any possible creeping current" would not be prevented in such an embodiment, contrary to the functional definition of claim 1.

The problem of the main request as regards an insufficient disclosure of the invention persisted in auxiliary requests Ia and I, because claim 1 of these

requests still covered embodiments having only one radially extending flange. These requests therefore did not meet the requirement of Article 83 EPC.

The opponent also raised an objection under Article 76(1) EPC relating to all requests. However, during the oral proceedings before the board this objection was withdrawn with respect to auxiliary request III.

Claim 1 of auxiliary request II still comprised the wording "whereby the hollow insulating ring (11) has an extended length for a creeping current on at least one of the surfaces of said first and second radially extending flanges [...] whereby the hollow insulating ring (11) has a ratio between the total height h of the insulating ring (11) and the total length L for a creeping current on at least one of the surfaces of said first and second radially extending flanges...". Thus, in spite of the provision of a first radially extending flange extending inwardly and a second radially extending flange extending outwardly, an extended length for a creeping current having the explicitly claimed ratio h to L , could only be present on one of the surfaces of the first and second radially extending flanges. The skilled person therefore would not know how to prevent any possible creeping current with an extended length for a creeping current only on the surface of the first or the second radially extending flange.

Documents D21 and D22 were *prima facie* relevant and therefore should have been admitted into the procedure by the opposition division.

As regards auxiliary request III, the opponent also raised an objection based on Article 56 EPC. Document

D2 disclosed the specific ratio h to L of $< 1:1.3$, because the figures were not only schematic drawings but represented cross-sectional views including drawings to scale. The same applied to documents D1, D3 and D4. Document D2 therefore merely differed from the subject-matter of claim 1 in the specifically claimed ratio of h to w of 1 to 3-10. When combining documents D2 and D6, this ratio would however be automatically achieved due to the provision of two radially extending flanges. Even if the specific ratio of h to L was not considered to be disclosed in documents D1 to D4, the selection of this range could be made by the skilled person in the course of routine tests or simulations. Furthermore, it was to be noted that the ratio of h to L could not lie anywhere else than in the range between 0 and 1. The specifically claimed range of h to L $< 1:1.3$ did not show any surprising effect and was thus a mere selection not involving an inventive step. The core idea of the invention, namely the provision of a long distance to creeping current, was further hinted at in document D8, see in particular figures 5 and 9 as well as column 12, lines 39 ff. The same applied to document D15 (see page 5, second paragraph), document D10 (see page 2, right-hand column, lines 27 ff.) and document D11 (see page 2, left-hand column, lines 49 ff.).

Reasons for the Decision

1. The appeals are admissible.
2. *Main request - Article 100(b) EPC*
 - 2.1 The patent under appeal does not disclose the invention in a manner sufficiently clear and complete for it to

be carried out by a person skilled in the art (Article 100(b) EPC).

2.2 It was not in dispute between the parties that claim 1 covers three embodiments, whereby two of these embodiments refer to a hollow insulating ring comprising only one radially extending flange, either extending inwardly or outwardly from a cylindrical part of the hollow insulating ring.

2.3 The board is not convinced by the proprietor's argument according to which claim 1 had to be interpreted such that the functional definition of claim 1, "thereby providing a long distance to any possible creeping current", exclusively referred to "any possible" creeping currents being present on the surface of a radially extending flange providing an extended length for a creeping current. In particular, the board is not convinced that the passage of claim 1 in question was to be interpreted as suggested by the proprietor: "thereby providing a long distance to any possible creeping current on said at least one of the surfaces of at least one of said first and second radially extending flanges (13 14)" (emphasis added by the board).

There is nothing in the claim that would lead the skilled person to believe that, contrary to the unambiguous meaning of "providing a long distance to any possible creeping currents" (emphasis added by the board), this wording should be interpreted in a fundamentally different way so that it does not refer to any possible creeping current but, on the contrary, only to a specific creeping current present on the surface of a radially extending flange. Moreover, such an interpretation cannot be derived merely from the

introduction of the functional definition by means of the term "thereby".

Thus, although the proprietor has correctly pointed out that, as a general rule, all features of the claim must be read together and, consequently, claim 1 must be considered in its entirety, the application of this principle in the present case does not lead to an interpretation of claim 1 which is contrary to what the skilled person would normally understand by the wording "thereby providing a long distance to any possible creeping current" in the overall context of claim 1.

2.4 According to the established case law of the Boards of Appeal, the invention is only sufficiently disclosed in the patent under appeal, if it allows the invention to be performed in the whole range claimed. This principle also applies to functional definitions contained in the claimed invention, and in the present case in particular to the functional definition "thereby providing a long distance to any possible creeping current" present in claim 1 (see Case Law of the Boards of Appeal of the European Patent Office, ninth edition 2019, II.C.5.4).

2.5 Claim 1 explicitly claims the provision of a "long distance for any possible creeping current", and thus clearly refers to creeping currents on the outer as well as on the inner surface of the insulating ring. The claimed effect is therefore achievable only by means of two flanges radially extending inwardly and outwardly, since a long distance is not provided for any possible creeping current in an embodiment having only one radially extending flange. The claimed alternative of only one radially extending flange facing either inward or outward in view of the claimed

objective to provide a long distance to any possible creeping current, therefore cannot be put into practice because the skilled person would not know how to provide a long distance to any possible creeping current with only one radially extending flange.

2.6 The board also does not share the patent proprietor's view that the disclosure of the patent under appeal, in particular in paragraphs [0007] and [0018], according to which in certain circumstances an outwardly radially extending flange was superfluous or creeping currents could be prevented by a coating, spoke in favour of a sufficient disclosure of the invention within the meaning of claim 1. Claim 1 explicitly requires the provision of "a long distance to any possible creeping current". It is evident that a coating as disclosed in paragraph [0007] of the patent under appeal does not provide "a long distance to any possible creeping current" as required by claim 1. It is also irrelevant for the question of sufficiency of disclosure of the invention of claim 1, whether an outwardly radially extending flange can be omitted or the length of it reduced depending on certain conditions. Rather, claim 1 explicitly requires the provision of "a long distance to any possible creeping current" (emphasis added by the board), and as outlined above, claim 1 clearly requires that this functional feature is also fulfilled for an embodiment having only one radially extending flange.

2.7 The board has therefore come to the conclusion that the opposition division was correct in its finding in the decision under appeal that the ground for opposition under Article 100(b) EPC prejudices the maintenance of the patent as granted and that the proprietor's main request is therefore not allowable.

3. *Auxiliary request Ia - Article 83 EPC*

Claim 1 of auxiliary request Ia is restricted to an embodiment of a gas discharge tube having only a first radially inwardly extending flange. Claim 1 is therefore restricted to an embodiment of claim 1, which led the board to the conclusion that the invention according to claim 1 of the main request does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 83 EPC). The amendment is therefore not adapted to overcome the objection of insufficiency of disclosure for the reasons set out under point 2 above.

Auxiliary request Ia therefore does not meet the requirement of Article 83 EPC and is consequently not allowable.

The question of whether auxiliary request Ia was to be excluded from the appeal procedure under Article 12(4) RPBA 2007 can therefore remain unanswered.

4. *Auxiliary request I - Article 83 EPC*

Claim 1 of auxiliary request I only differs from claim 1 of the main request in that the wording "1:1.3, whereby the ratio h to L is preferably 1:1.5, preferably" has been deleted. The board agrees with the opponent that this amendment does not have any effect on the question of whether the invention of claim 1 is described in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, since claim 1 of auxiliary request I still covers

an embodiment with only one radially extending flange, whereas claim 1 also for this embodiment explicitly requires the provision of "a long distance to any possible creeping current".

Auxiliary request I therefore does not meet the requirement of Article 83 EPC and is consequently not allowable.

5. *Auxiliary request II - Article 83 EPC*

5.1 The patent under appeal does not disclose the invention as claimed by claim 1 of auxiliary request II in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 83 EPC).

5.2 Claim 1 of auxiliary request II comprises the following wording:

"whereby the hollow insulating ring (11) has an extended length for a creeping current on at least one of the surfaces of said first and second radially extending flanges [...] whereby the hollow insulating ring (11) has a ratio between the total height h of the insulating ring (11) and the total length L for a creeping current on at least one of the surfaces of said first and second radially extending flanges..." (emphasis added by the board)

The expression "at least one of the surfaces" occurring twice in claim 1 implies that despite the provision of a first radially extending flange extending inwardly and a second radially extending flange extending outwardly, an extended length for a creeping current can only be present on one of the surfaces of the first

and second radially extending flanges and in particular can have a ratio h to L of smaller than 1:1.3 only on one radially extending flange. Consequently, as has been convincingly argued by the opponent, an embodiment of a gas discharge tube falls within the ambit of claim 1, which has an extended length for a creeping current on only one surface of the first and second radially extending flanges and which has a ratio h to L , which is smaller than 1:1.3 only on one of the surfaces of the radially extending flanges.

In the light of this, the board is convinced that the explicit functional requirement of claim 1, according to which a long distance is provided to any possible creeping current, cannot be put into practice, because the skilled person would not know how to provide a long distance to any possible creeping current on the hollow insulating ring, if an extended length for a creeping current is only present on one of the surfaces of the first and second radially extending flanges and if only one surface of the first and the second radially extending flanges has a ratio h to L , which is smaller than 1:1.3. In the light of the fact that claim 1 of auxiliary request II explicitly refers twice to at least one of the surfaces of said first and second radially extending flanges, the proprietor's argument that claim 1 explicitly claims a first and a second radially extending flange must be considered irrelevant, because the definition of the first and the second flanges in claim 1 is not such that an extended length for a creeping current is present on both surfaces, i.e. on the surface of the first radially extending flange and on the surface of the second radially extending flange. Rather, claim 1 covers embodiments having two radially extending flanges, namely one inwardly extending and one outwardly

extending flange, wherein however only the surface of one of these radially extending flanges has an extended length for a creeping current and it is not possible for a corresponding embodiment to provide a long distance to any possible creeping current, contrary to the explicit requirement of claim 1.

5.3 The invention according to claim 1 of auxiliary request II consequently does not meet the requirement of Article 83 EPC and is therefore not allowable.

6. *Auxiliary request III*

6.1 *Article 12(4) RPBA 2007*

6.1.1 While the opponent requested by letter of 1 April 2019 that auxiliary request III not be admitted into the appeal procedure as having been late filed, the opponent did not present any arguments in support of this request throughout the appeal proceedings.

6.1.2 The board has decided to exercise their discretion under Article 12(4) RPBA 2007 (which is applicable in this case under Article 25(2) RPBA 2020) not to exclude auxiliary request III from the appeal procedure. The board considers the filing of auxiliary request III with the reply, dated 23 November 2018, to the opponent's statement setting out the grounds of appeal to be a legitimate reaction to the opponent's new objection against auxiliary request II on pages 4 to 5 of their grounds of appeal, referring to the wording "on at least one of the surfaces of" in claim 1 of auxiliary request II.

6.2 *Article 83 EPC*

- 6.2.1 In their grounds of appeal the opponent has argued that the ratio of h to w , defined in claim 1 as "1 to 3 to 10", could be interpreted to mean 1/3 to 10, and the skilled person could therefore not implement the invention, because embodiments were included in the claimed range of "1/3 to 10", which included a ratio h to w larger than 1.
- 6.2.2 An interpretation of claim 1 in the sense of a ratio h to w of 1/3 to 10, rather than 1/3 to 1/10, does not make sense from a technical point of view and would therefore not be considered by the skilled person as a reasonable interpretation of claim 1. Hence, the opponent's objection under Article 83 EPC is based on an unreasonable interpretation of claim 1, and therefore does not convince the board.
- 6.2.3 Furthermore, claim 1 of auxiliary request III is restricted to an embodiment having a first radially extending flange extending inwardly and a second radially extending flange extending outwardly, as well as to an extended length for a creeping current on the surfaces of the first and second radially extending flanges. The opponent's remaining objections under Article 83 EPC with regard to the main request and auxiliary requests Ia and I are thus considered to be overcome.
- 6.2.4 Since the opponent did not submit any further objections in this context, the board considers auxiliary request III to meet the requirements of Article 83 EPC.

6.3 *Relevance of documents D21 and D22*

- 6.3.1 According to Article 12(4) RPBA 2007, the board has the discretionary power to exclude facts, evidence and requests which were not admitted in the first instance proceedings. In the present case, the opposition division did not admit late filed documents D21 and D22 (English translation of D21) on the ground that these documents were not considered to be *prima facie* relevant (see point 20.3 of the reasons for the decision under appeal).
- 6.3.2 The board has come to the conclusion that the question of whether documents D21 and D22 are to be admitted into the appeal proceedings can remain unanswered, because the board in any case does not consider documents D21 and D22 to be more relevant than document D2.
- 6.3.3 The opponent has argued in the grounds of appeal that D22 on page 6, lines 27 ff. explicitly disclosed that the position or dimension of the flange had no influence on the creeping current reducing effect of the flange. In light of this, the opponent considered the disclosure of D21/D22 as evidence that the flange dimensions defined in claim 1 had no technical effect but were chosen arbitrarily and therefore did not contribute to an inventive step.
- 6.3.4 The board is not convinced by the opponent's argument. Claim 1 is not limited to a dimensioning of the flanges, but defines concrete ratios of both the height h of the hollow insulating ring to the creeping current length L as well as the ratio of the height h to the width w of the hollow insulating ring. Consequently, claim 1 contains a dimensioning ratio not only for the

creeping current path but also for the insulating ring. The fact that D22 on page 6 might disclose that the dimension of the flange had no influence on the creeping current reducing effect, therefore, does not render D21/D22 more relevant than D2 in light of the subject-matter of claim 1. Notwithstanding the specific disclosure of D22 on page 6, the opponent has acknowledged the similarity between D22 and D2.

6.3.5 In view of the board's finding that documents D21 and D22 are no more relevant than document D2, the board's observations on document D2 under point 6.4 below also apply in principle to D21 and D22, so that a discussion of whether these documents were to be excluded from the appeal proceedings could be left unanswered.

6.4 *Article 56 EPC*

6.4.1 Novelty of the subject-matter of claim 1 of auxiliary request III was not in dispute.

6.4.2 The opponent has presented various combinations of documents in order to demonstrate that the subject-matter of claim 1 of auxiliary request III did not involve an inventive step in the sense of Article 56 EPC. The different combinations are in particular based on documents D1, D2, D3 or D4 as starting points in the assessment of inventive step, in particular in combination with D6, D7 or D8 or further in combination with documents D10, D11 or D15.

6.4.3 The board has come to the conclusion that the subject-matter of claim 1 of auxiliary request III involves an inventive step in view of the combinations of documents presented by the opponent. None of these documents directly and unambiguously discloses a ratio between

the total height h of the hollow insulating ring and the total length L for a creeping current of $< 1:1.3$. Nor is a corresponding range of the ratio h to L rendered obvious by any of the relevant prior art documents or by the common general knowledge of the skilled person. Moreover, none of the documents D1 to D4 discloses an insulating ring with radially extending flanges on its inner and outer surfaces, or a ratio of total height h to width w in the range 1 to 3-10.

6.4.4 Claim 1 of auxiliary request III specifies that the hollow insulating ring has a ratio between the total height h of the hollow insulating ring and the total length L for a creeping current on the surfaces of the first and second radially extending flanges facing inward and outward respectively of $< 1:1.3$. The board does not share the opponent's view that a corresponding range of the ratio between the total height h and the total length L for a creeping current is directly and unambiguously derivable from the drawings of documents D1 or D2. Neither of these documents discloses drawings to scale, instead they are rather schematic drawings, from which the claimed range of the ratio h to L cannot be derived in an unambiguous manner. This also applies to the other documents in the procedure.

In appeal case T 0748/91, referred to by the opponent, the description of the patent contained a teaching sufficient for the skilled person to interpret the drawing unambiguously within the meaning of the added feature in question. That decision is thus based on special circumstances which are neither apparent in the present case nor have corresponding special circumstances been presented by the opponent. In T 0451/88 the board confirmed that schematic drawings cannot form the basis for dimensional ratios. An

inconsistency in the case law is therefore not apparent from the two decisions cited by the opponent.

It is established case law of the Boards of Appeal that schematic drawings cannot be used to derive a ratio between two dimensions (see Case Law of the Boards of Appeal, ninth edition 2019, I.C.4.6). In accordance with these principles, the board does not consider the specifically claimed range of $< 1:1.3$ of the h to L ratio to be directly and unambiguously derivable from any of the relevant documents cited by the opponent in the assessment of inventive step, in particular not from document D1 and D2.

A line of argument submitted by the opponent was centered on the alleged lack of a combined technical effect of the specifically claimed ranges of the ratios h to L and h to w. The board does not find this argument convincing and rather agrees with the proprietor that a smaller ratio h to L clearly leads to a longer creeping current path in relation to the height of the hollow insulating ring and that the claimed range of the ratio h to L additionally contributes to achieving a flatter shape of the hollow insulating ring. This is all the more true if the range from 1 to 3-10 (1:3 to 1:10) of the ratio h to w, as defined in claim 1 of auxiliary request III, is additionally taken into account. It is therefore also not apparent to the board that the ranges defined in claim 1 constitute an arbitrary selection.

- 6.4.5 Documents D1 to D4, presented by the opponent as starting points in the assessment of inventive step, have thus in common that they do not disclose a second radially outwardly extending flange extending from a cylindrical part of a hollow insulating ring of a gas

discharge tube. Furthermore, the board concludes that none of these documents discloses the specific ranges of the ratios h to L and h to w as defined in claim 1.

6.4.6 The proprietor has seen the objective technical problem in how to provide a gas discharge tube designed to avoid a creeping current. While it seems questionable whether a more narrowly formulated objective technical problem would be more appropriate, this question can remain unanswered, because the board has in any case come to the conclusion that the subject-matter of claim 1 is not rendered obvious by the prior art, even in the light of the broadly formulated objective technical problem.

6.4.7 The opponent has argued that the skilled person could determine a ratio of h to L in the range of $< 1:1.3$ in the course of routine experiments or simulations. The board has no doubt that the specific ratio *could* have been found. It is, however, not apparent to the board what *would* have motivated the person skilled in the art to modify the respective gas discharge tubes disclosed in D1, D2, D3 or D4 such as to arrive at the claimed range of the ratio h to L in a gas discharge tube comprising a radially inwardly extending flange and a radially outwardly extending flange. Given that the opponent has not put forward any further convincing arguments in this respect, the board agrees with the proprietor that the argument that the skilled person by way of routine experiments could (and would) have found the specific range of the ratio h to L as defined in claim 1, remains a purely hypothetical consideration.

6.4.8 In the discussion of inventive step based on document D2 as the closest prior art document, it was not in dispute that this document does not disclose a radially

outwardly extending flange. The board agrees with the proprietor that a further extension of the radially inwardly extending flange of D2 is not plausible in view of the limiting space in view of the protruding electrode portions 4b, 4b'. Furthermore, it is not in dispute that D2 discloses the possibility of providing a second radially inwardly extending flange, resulting in an extension of the total length L of the insulating ring. However, the wording of claim 1 does not leave any doubt that there are only one first radially inwardly extending flange and one second radially outwardly extending flange extending from the cylindrical part of the hollow insulting ring, and thus it is clear from the wording of claim 1 that the claimed range of the ratio h to L is achieved only by a single flange on either side of the hollow insulating ring.

6.4.9 Finally, each of documents D6, D7, D8, D10, D11 and D15 might disclose the general idea of providing an extended length for a creeping current. None of these documents however discloses or suggests the range of $< 1:1.3$ of the ratio h to L. The same applies to the range of 1 to 3-10 of the ratio h to w as defined in claim 1.

6.4.10 In summary, the person skilled in the art, starting from one of the documents D1 to D4 and confronted with the objective technical problem would, in order to arrive at the subject-matter of claim 1, in a first step, first have had to provide a second flange extending radially outwards, and in a second step, have had to modify the dimensions of the hollow insulating ring according to the specific ranges of the two ratios h to L and h to w as defined in claim 1.

The opponent has not presented convincing arguments as to why the person skilled in the art not only could have made the modifications that were necessary starting from D1 to D4 in order to arrive at the subject-matter of claim 1, but they actually would have done so. The mere fact that each of the individual features might have been known or obvious to the skilled person, in the present case does not constitute a convincing argument.

6.4.11 The board has therefore come to the conclusion that the subject-matter of claim 1 of auxiliary request III involves an inventive step in the sense of Article 56 EPC.

7. *Result*

Given that the proprietor's main request as well as auxiliary requests Ia, I and II are not allowable and further considering that the opponent's objections to auxiliary request III are unfounded, the board had to accede to the proprietor's auxiliary request III.

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 the claims of auxiliary request III, filed with letter of 23 November 2018 and a description to be adapted where appropriate.

The Registrar:

The Chairman:



A. Chavinier Tomsic

R. Lord

Decision electronically authenticated