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**Datasheet for the decision
of 12 April 2021**

Case Number: T 2481/17 - 3.5.02

Application Number: 07784479.3

Publication Number: 2033283

IPC: H01T13/20

Language of the proceedings: EN

Title of invention:

Small Diameter/Long Reach Spark Plug

Patent Proprietor:

Tenneco Inc.

Opponent:

Reininger, Jan Christian

Relevant legal provisions:

EPC Art. 56

RPBA Art. 12(4)

EPC R. 103(4)(a)

Keyword:

Inventive step - all requests (no) - juxtaposition of obvious features

Admissibility of auxiliary requests - (no) - should have been filed in the first instance proceedings

Prohibition of reformatio in peius - Admissibility of auxiliary requests does not have to be decided in the present case

Partial reimbursement of the appeal fee - 25% (yes)



Beschwerdekammern

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Case Number: T 2481/17 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 12 April 2021

Appellant: Tenneco Inc.
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted on
29 August 2017 concerning maintenance of the
European Patent No. 2033283 in amended form.

Composition of the Board:

Chairman R. Lord
Members: F. Giesen
W. Ungler

Summary of Facts and Submissions

I. The patent proprietor and the opponent filed appeals against the interlocutory decision of the Opposition Division posted on 29 August 2017 concerning maintenance of the European Patent No. 2033283 in amended form. In particular, the Opposition Division was of the opinion that the subject-matter of claim 1 of the then auxiliary request 1 involved an inventive step in view of document

E2: EP 1 317 039 A2.

II. On 6 November 2020 the Board issued summons to oral proceedings together with a communication pursuant to Article 15(1) RPBA informing the parties of the Board's preliminary opinion.

III. By letter dated 22 February 2021 the patent proprietor withdrew their appeal and their request for oral proceedings. Consequently the Board cancelled the oral proceedings.

IV. The appellant (opponent) requested in his statement of grounds of appeal that the impugned decision be set aside and the opposed patent be revoked. Oral proceedings were requested in case the Board did not intend to accede to the opponent's main request.

The respondent (patent proprietor) requested in their statement of grounds of appeal that the impugned decision be set aside and the patent be maintained on the basis of the claims of the main request or, as an auxiliary measure, on the basis of the claims of one of

the first to eighteenth auxiliary requests, all filed with the statement of grounds of appeal.

- V. While by withdrawing the appeal, the respondent no longer pursues the main request, the auxiliary requests can be more easily presented, when the Board first reproduces the wording of claim 1 of the **main request** of the respondent's statement of grounds of appeal, which reads as follows:

"A spark plug for a spark-ignited combustion event, said spark plug comprising:

an elongated ceramic insulator (12) having an upper terminal end (20), a lower nose end, and a central passage (18) extending longitudinally between said terminal and nose ends (20, 22);

said insulator (12) including an exterior surface presenting a generally circular large shoulder (66) proximate said terminal end (20) and a generally circular small shoulder (68) proximate said nose end (22), said large shoulder (66) having a diameter greater than the diameter of said small shoulder (68);

a conductive shell (24) surrounding at least a portion of said insulator (12), said shell including at least one ground electrode (26);

a conductive center electrode (48) disposed in said central passage (18) and having an exposed sparking tip (50) proximate said ground electrode (26);

said insulator having a nose region extending from said nose end (22), said nose region having a maximum outer diameter $d(\text{base})$ measured adjacent said small shoulder

and a minimum outer diameter $d(\text{tip})$ measured adjacent said sparking tip (50) of said center electrode (48);

and said shell including an inner bore diameter $ID(\text{shell})$ surrounding said nose region of said insulator (12), and wherein a spatial relationship is established according to the formula:

$$0.5 \leq (d(\text{base}) + d(\text{tip})) / (2 ID(\text{shell})) \leq 0.7$$

the spark plug being characterized in that said insulator further includes a rounded transition and, spaced there from by a transition length $L(\text{transition})$, a filleted transition, both said rounded and filleted transitions located longitudinally between the disparate diameters of said large and small shoulders, said rounded transition having a major diameter $D2$ and said filleted transition having a minor diameter $D1$, and wherein a spatial relationship is established according to the formula:

$$0.5 \leq (D2 - D1) / L(\text{transition}) \leq 3.5 ."$$

- VI. Claim 1 according to the **first auxiliary request**, i.e. as maintained, had in addition to the words of the main request, the words

"and further wherein a frustaconically [sic] sloped transition surface (78) extends between the rounded transition (74) and the filleted transition (76);"

after the words "said large and small shoulders".

- VII. In claim 1 according to the **second auxiliary request** the second equation of the main request was replaced by

$$"0.55 \leq (D2 - D1) / L(\text{transition}) \leq 1.2".$$

VIII. In claim 1 according to the **third auxiliary request** the second equation of the main request was replaced by

$$"0.6 \leq (D2 - D1) / L(\text{transition}) \leq 0.8".$$

IX. In claim 1 according to the **fourth auxiliary request** the words

"wherein over the longitudinal length of the nose portion the wall thickness of the insulator (12) tapers from the larger d(base) measure to the smaller d(tip) measure;"

were inserted after the words *"adjacent said sparking tip (50) of said center electrode (48)"* of the main request.

X. Claim 1 according to the **fifth auxiliary request** combines the amendments of the first and second auxiliary requests.

XI. Claim 1 according to the **sixth auxiliary request** combines the amendments of the first and third auxiliary requests.

XII. Claim 1 according to the **seventh auxiliary request** combines the amendments of the first and fourth auxiliary requests.

XIII. Claim 1 according to the **eighth auxiliary request** combines the amendments of the first, second and fourth auxiliary requests.

- XIV. Claim 1 according to the **ninth auxiliary request** combines the amendments of the first, third and fourth auxiliary requests.
- XV. In claim 1 according to the **tenth auxiliary request**, the first equation of claim 1 according to the first auxiliary request is replaced by the equation
- $$"0.57 \leq (d(base) + d(tip)) / (2 ID(shell)) \leq 0.66".$$
- XVI. In claim 1 according to the **eleventh auxiliary request** the first equation of claim 1 of the main request is replaced by the first equation of the tenth auxiliary request and the second equation is replaced by the second equation of the second auxiliary request.
- XVII. In claim 1 according to the **twelfth auxiliary request** the first equation of claim 1 of the main request is replaced by the first equation of the tenth auxiliary request and the second equation is replaced by the second equation according to the third auxiliary request.
- XVIII. In claim 1 according to the **thirteenth auxiliary request** the first equation of the fourth auxiliary request is replaced by the first equation of the tenth auxiliary request.
- XIX. In claim 1 according to the **fourteenth auxiliary request** the first equation of claim 1 of the first auxiliary request was replaced by the first equation of the tenth auxiliary request and the second equation was replaced by the second equation of the second auxiliary request.

- XX. In claim 1 according to the **fifteenth auxiliary request** the first equation of claim 1 of the first auxiliary request was replaced by the first equation of the tenth auxiliary request and the second equation of the first auxiliary request was replaced by the second equation of the third auxiliary request.
- XXI. Claim 1 according to the **sixteenth auxiliary request** combines the amendments of the first and fourth auxiliary requests and the first equation is as in the tenth auxiliary request.
- XXII. In claim 1 according to the **seventeenth auxiliary request** the second equation of the sixteenth auxiliary request is replaced by the second equation of the second auxiliary request.
- XXIII. In claim 1 according to the **eighteenth auxiliary request** the second equation of the sixteenth auxiliary request is replaced by the second equation of the third auxiliary request.
- XXIV. The appellant's arguments in so far as they are relevant for the present decision can be summarised as follows:

The subject-matter of claim 1 of the first auxiliary request did not involve an inventive step in view of document E2. Document E2 and the opposed patent were both concerned with miniaturising spark plugs. Document E2 was therefore a suitable choice as closest prior art. The only distinguishing features could be seen in the range of the first ratio concerning the nose transition (the first equation) and in the frustoconically sloped transition between the rounded and the filleted transitions. These two features were

not interrelated and did not provide a synergistic effect. Hence, these features could be considered separately.

Concerning the claimed range for the ratio according to the first equation, the mere definition of the first ratio were not associated with a technical effect. As a matter of fact, the range for the first ratio had to be between 0 and 1. Practically, the ceramic insulator had to have a certain minimum diameter at the tip taking into account the necessary diameter of the center electrode and the required thickness of the insulating material around the center electrode. For that reason values of R_1 lower than 0.5 or 0.4 were practically impossible. Document E2 disclosed in figure 1(a) and 4 the existence of a gap between the ceramic insulator of the nose region and the inner wall of the shell. Thus, the ratio R_1 of the spark plug disclosed in E2 had to be less than 1.0, likely less than 0.9 or even less than 0.8. The claimed range 0.5 to 0.7 for the first ratio was merely an arbitrary selection largely overlapping the practically possible range of around 0.5 to 0.9. It was therefore obvious to provide the claimed range.

Concerning the second distinguishing feature, there was no support for the interpretation that the frustoconically sloped transition surface must extend continuously over the entire length of the transition region between the round and filleted transitions. According to the description other gently curved ranges were also possible. E2 illustrated in figures 5(a) to 5(d) different variations of frustoconically sloped transitions with gently curved profiles. In particular, figure 5(d) showed a frustoconically sloped transition with a gently curved profile improving the mechanical

resistance and stability of the insulator, according to paragraphs [0022] and [0023] of E2. The second distinguishing feature was therefore also obvious.

The auxiliary requests should not be admitted. Auxiliary requests 4, 7 to 9, 13 and 16 to 18 had not been submitted in the first instance proceedings although they should have been. The respondent did not provide any reasons for filing these requests only in the appeal proceedings. The number of auxiliary requests was excessive in view of the fact that they were merely the combinations of non-inventive features. By withdrawing the appeal, the respondent had lost interest in the outcome. Therefore none of the auxiliary requests should be admitted.

XXV. The respondent's arguments in so far as they are relevant for the present decision can be summarised as follows:

The subject-matter of claim 1 of the first auxiliary request involved an inventive step in view of E2. Document E2 neither disclosed the first claimed ratio and range concerning the nose transition nor the second ratio and range concerning the transition between the round and filleted transitions nor that a frustaconically sloped transition surface extended between the rounded transition and the filleted transition. Concerning the first two features, the figures in E2 were not true to scale so that dimensions were not directly and unambiguously derivable from them. Concerning the third feature, E2 showed an angled transition with two straight sections which was different from the claimed transition shape. The meaning of the wording of claim 1 could not be replaced by other features of the description clearly presented

as alternatives. Providing the second distinguishing feature was not obvious as there was no incentive for a skilled person in E2 to implement the transition between the rounded and filleted transitions according to the second claimed ratio and range. In order to suggest the second ratio it was not enough that some values falling in the claimed range for the ratio were derivable from E2, but E2 would have had to disclose the ratio as such. However, E2 went in a completely different direction by teaching to investigate a ratio between axial length of two portions of the insulator. Providing the third distinguishing feature was also not obvious, since the shape of the transition in E2 was chosen to achieve stress scattering. The aim of the invention according to claim 1 was that of preventing stress concentration by properly shaping the transition area of the insulator, whereas the aim of document E2 was completely different. Instead of preventing stress concentration, E2 taught to "scatter" stress concentration over multiple locations to distribute the same.

The auxiliary requests were filed in order to provide a complete appeal case, as required by Article 12 RPBA.

Reasons for the Decision

1. *Admissibility of the Appeal*

The appeal was filed in due time and form. It is therefore admissible.

2. *Decision in Writing*

Handing down this decision in the written proceedings, is in keeping with the parties' rights pursuant to Article 116 EPC. The appellant requested oral proceedings only as an auxiliary measure on the condition that the Board did not accede to the appellant's main request, which is not the case here. The respondent has unconditionally withdrawn the request for oral proceedings.

Handing down the present decision in writing is also in keeping with the parties' rights pursuant to Article 113(1) EPC. The reasons for this decision have been communicated to the parties in the communication pursuant to Article 15(1) RPBA as well as the statements of grounds of appeal and the replies. Consequently, both parties have had a chance to comment on them.

3. *Main Request*

The respondent requested in their statement of grounds of appeal as a main request that the impugned decision be set aside and the patent be maintained in the version of the main request dated 7 October 2016, which is identical to the main request in opposition proceedings. However, by withdrawing the appeal, the respondent limits themselves to defending the patent in the version maintained in the opposition proceedings, viz. the first auxiliary request, or on the narrower auxiliary requests filed with the statement of grounds of appeal. In other words, withdrawal of the appeal is also a withdrawal of the respondent's main request.

4. *Admittance of Auxiliary Requests*

4.1 According to Article 12(4) RPBA 2007, which is applicable by virtue of Article 25(1) RPBA 2020, the Board has the power to hold inadmissible facts, evidence or requests which could have been presented or were not admitted in the first instance proceedings.

4.2 The fourth, seventh to ninth, thirteenth and sixteenth to eighteenth auxiliary requests have not been presented in the first instance proceedings. The sole reason provided by the respondent for filing these requests in the appeal proceedings is to make the respondent's appeal as complete as possible. Completeness of a party's appeal case within the meaning of Article 12 RPBA 2007 has to be seen in the light of the purpose of appeal proceedings as a judicial review of the first instance proceedings. Everything needed for this review has to be presented. However, the filing of the above requests for the first time in appeal proceedings contributes nothing to completing the case for judicial review but amounts rather to a continuation of the first-instance proceedings, simply providing yet more fall-back positions in addition to an already very high number of auxiliary requests.

4.3 In contrast, the first to third, fifth, sixth, tenth to twelfth, fourteenth and fifteenth auxiliary requests have been presented in the first instance proceedings, namely two months before the oral proceedings before the Opposition Division.

The Board observes that claim 1 as maintained in opposition was limited to a frustoconically sloped transition. Only the independent claims according to the first, fifth to tenth and fourteenth to eighteenth auxiliary requests are also limited to the frustoconically sloped transition. The Board is aware of the prohibition of reformatio in peius according to decisions G 9/92 and G 4/93, both OJ 1994, 875. However, the admissibility of the second to fourth and eleventh to thirteenth auxiliary requests in view of the prohibition of reformatio in peius does not have to be discussed here because the Board had informed the parties that it considered none of the auxiliary requests to meet the requirements of Article 56 EPC, for reasons as explained in the following. Admitting and discussing these requests is procedurally more efficient and cannot, in view of the Board's conclusions, put the sole appellant in a worse position than if he had not appealed.

5. *First Auxiliary Request - Article 56 EPC in View of E2*

5.1 The subject-matter of claim 1 of the first auxiliary request does not involve an inventive step within the meaning of Article 56 EPC.

5.2 Closest Prior Art

Document E2 is a suitable choice of starting point for assessing inventive step, in particular since E2 is also concerned with miniaturising spark plugs, see column 1, lines 24 to 26 and mechanical strength of the insulator, see column 2, lines 37 to 45.

5.3 Distinguishing Features

5.3.1 The Board is satisfied that E2 discloses all features of claim 1 of the main request except the following:

- (a) $0.5 \leq (d(\text{base}) + d(\text{tip})) / (2 ID(\text{shell})) \leq 0.7$
- (b) $0.5 \leq (D1 - D2) / L(\text{transition}) \leq 3.5$
- (c) a frustaconically sloped transition extending between the rounded and filleted transitions.

This has not been disputed by the respondent.

5.3.2 Features (a) and (b) are not directly and unambiguously derivable from E2 for the following reasons:

The figures in E2 cannot be taken to be true to scale. While the ratio F/T might be consistent with the description, the ratio D/E should be $21/33 \sim 0.64$ according to E2, column 12, lines 56 and 57. However, figure 4 depicts a ratio of about 0.375. The reason is probably that a single figure is used to illustrate different embodiments of D and E, the ratio of which which can vary in a wide range from 0.3 to 1.2 according to column 14, lines 21 and 22. Given the clear disclosure of two distinct embodiments in E2, the second embodiment further containing a range for D, the appellant's assertion that E2 disclosed only a single embodiment does not persuade the Board. Also the cross-sectional areas S1 and S2 are disclosed as differing somewhat between embodiments 1 and 2, which is not reflected in figures 3 or 4.

This uncertainty as to which parts of the figures are drawn to scale affects any determination of the longitudinal transition length, and the diameters,

which are linked to the cross-sectional areas by measurements taken from the drawings.

5.3.3 Feature (c) is not disclosed in E2 for the following reasons:

The expression "extends between" implies that the frustoconical sloped transition occupies some of the space between the round transition and the filleted transition. Use of the singular ("a frustoconical sloped transition") together with the term "extends between" indicates that there is only one transition in the space between the round and the filleted transitions. A cone has straight outer edges in any section along a plane through its centre line. The same is true for a frustum of a cone, *i.e.* a cone with cut off tip. Hence it is justified to conclude that the surface between the transitions must be a straight line extending between the rounded and the filleted transitions in any section along a plane through the centre. In contrast, figure 5(b) shows two frustoconically sloped transitions 2j and 2k extending between the round and filleted transitions.

5.4 Technical Effects and Partial Technical Problems

5.4.1 The distinguishing features have no synergy.

Concerning distinguishing feature (a), according to page 7, lines 28 to 32 of the opposed patent, the claimed dimensions for the nose eliminate the tendency for spark tracking (*viz.* surfaces charges travelling up the insulator nose) and creation of secondary spark locations. The board considers this disclosure plausible. The appellant's assertion that no technical

effect was associated with the range and ratio therefore does not persuade the Board.

Concerning distinguishing feature (b), according to page 6, lines 18 to 24, the shape of the "shallow" transition achieves lower bending moment loads and compression stress.

Concerning distinguishing feature (c), the opposed patent is silent as to any specific technical effect connected with the particular frustoconically sloped shape.

The respondent argued in their reply of 16 May 2018 in point 6.1 that the aim of the claimed subject-matter was to prevent stress concentration, which was "totally different to the scattering of stress concentration over multiple locations to distribute the same" according to paragraph [0021] of E2. To the Board it is neither self-evident nor has it been demonstrated by evidence nor disclosed in the opposed patent that a frustoconically sloped transition prevented stress concentration. The stress-field will certainly be rather complex given the complex shape of the insulator and conductive sleeve. Both the opposed patent and E2 deal with alleviating stress in the transition region. A single straight frustoconical transition as in claim 1 will cause a concentration of stress at the rounded and filleted transition. The additional inflection at point A in figure 5(b) of E2 appears to have the purpose of alleviating the stress concentrations at the rounded transition (between 2e and 2j) and the filleted transition c. It follows that the arrangement according to claim 1 of the first auxiliary request, rather than being "totally different", is very similar and merely accepts a higher stress concentration at the rounded

and filleted transitions than E2. The Board cannot recognise any other beneficial technical effect associated with the claimed shape, and the respondent has not indicated any.

It follows that the technical effects of the distinguishing features (a) to (c) are different and consequently, that there is no synergy between them.

5.4.2 The technical effects achieved by the distinguishing features are already achieved in document E2.

Concerning the technical effect of spark tracking and secondary spark locations associated with distinguishing feature (a), the shape of standard spark plugs, and also in particular that of E2, typically shows a constant inner diameter of the conductive shell and a tapering insulator. The purpose of this standard shape is to strike a balance between avoiding unwanted sparks towards the outer shell and mechanical resistance of the tip. Given this, the same technical effect is achieved by the shape disclosed in E2 and that claimed. On the basis of the disclosure of the contested patent or any other submission by the respondent, nothing indicates that the particular ratio claimed improves this effect in any way.

Concerning the technical effect associated with distinguishing feature (b), E2 discloses a transition with a rounded transition (between 2e and 2j) and a filleted transition (between 2k and 2g) in figure 5(b). According to column 7, line 57 to column 8, line 5 this arrangement improves the resistance against bending moments and according to column 8, lines 17 to 27 it alleviates stresses at the filleted transition. It follows, that E2 already achieves the same technical

effect as the transition of claim 1 of the main request.

Concerning the technical effect associated with the last distinguishing feature (c), the Board explained in the section 5.4.1 that no particular technical effect is derivable for feature (c).

5.4.3 Therefore the first objective partial technical problem can be seen in specifying particular implementations of nose transitions of the state of the art known for avoiding spark tracking and secondary spark locations.

The second objective partial technical problem can be seen in specifying particular implementations of transitions of the state of the art known for providing low bending moment loads and compression stress.

The third objective partial technical problem can be seen in providing alternative shapes of the transition region.

5.5 Assessment of the Solution

5.5.1 The solution to the first partial technical problem is obvious. In the context of the standard spark plug tapered nose, $d(\text{tip})$ will necessarily be smaller than $d(\text{base})$. The expression $(d(\text{tip}) + d(\text{base})) / 2$ of the claimed ratio can thus not be larger than $d(\text{base})$, which would be the case of no taper or $d(\text{tip}) = d(\text{base})$. Given that no portion of the insulator can be larger than the inner diameter of the conductive outer shell, $d(\text{base})$ will be smaller than $ID(\text{shell})$ with the consequence that the ratio will be smaller than 1. Given that the tip cannot be made infinitely fine for mechanical and electrical reasons

(viz. $d(\text{tip}) > 0$), there will certainly be a lower boundary larger than zero given by $d(\text{base}) / (2 ID(\text{shell}))$. Given that $d(\text{base})$ will be similar to $ID(\text{shell})$ but somewhat smaller, the lower boundary will be somewhat smaller than 0.5. Therefore, the appellant is correct in pointing out that the physically possible range for the claimed ratio is essentially confined to the interval between 0.5 and 1.

The Board concurs with the appellant's argument that the claimed range covers a substantial part of the physically possible range. It is obvious for a skilled person to fabricate nose portions similar to those disclosed in E2 across a large part of the physically possible range and check whether they provide sufficient suppression of side sparks and reasonable mechanical and electrical properties of the inner electrode and insulator as already achieved in E2.

5.5.2 The solution to the second partial technical problem is obvious. Specifying a particular range of dimensions for the transition of figure 5(b) of E2 does not require inventive activity. All that a skilled person would have to do is fabricate different transitions in the shape of figure 5(b) of E2 and check whether they have sufficient bending and compressive stress resistance as already required and achieved in E2. This can be characterised as routine work rather than inventive activity.

5.5.3 The solution to the third partial technical problem is obvious. A skilled person starting from E2 would, as argued above, routinely test different diameter and transition length values and retain those which achieve sufficient bending strength. Given that the skilled person accepts higher stress concentration at the

rounded and filleted transitions with the claimed solution, and given that the skilled person could then readily and correctly predict on the basis of E2 that in that case the further inflection point at A in figure 5(b) E2 is no longer necessary, it would be obvious to replace the two angled frustoconical sloped transitions according to E2 by a single one if one wanted to provide further alternative transition shapes.

5.6 For these reasons, the subject-matter of claim 1 of the first auxiliary request does not involve an inventive step within the meaning of Article 56 EPC.

6. *Further Auxiliary Requests - Article 56 EPC*

The independent claims according to the second, third, fifth, sixth, tenth to twelfth, fourteenth and fifteenth auxiliary requests are directed to permutations of narrower versions of features (a) and (b) by claiming narrower numerical ranges and the presence or absence of the frustoconical sloped transition according to feature (c).

The respondent has neither presented any specific technical effect associated with the narrower ranges for features (a) or (b) nor demonstrated any synergy between any two of the three features which are permuted. Concerning feature (a) of the first auxiliary request, the conclusion applies also to the narrower versions of that feature. Starting from E2, a skilled person is given a shape of the transition which is suitable for avoiding spark tracking and a practically possible parameter range. Specifying narrower sub-ranges of that range merely to achieve the

technical effect already achieved in E2 is obvious, since in the present case no further or surprising effect is achieved. The Board's reasoning concerning the feature (b) of the first auxiliary request did not depend on the specific range.

The Board therefore concludes that the subject-matter of claim 1 of each of the second, third, fifth, sixth, tenth to twelfth, fourteenth and fifteenth auxiliary requests also does not involve an inventive step for essentially the same reasons as for the first auxiliary request.

7. *Reimbursement of the Appeal Fee*

The respondent has requested reimbursement of the appeal fee at 25% according to Rule 104(3)(a) EPC. The respondent's request was made more than one month after the notification of a communication issued by the Board of Appeal in preparation for the oral proceedings but before the present decision is issued. For the purposes of application of Rule 103(4)(a) EPC, the Board considers it equivalent whether a decision is announced at the oral proceedings or issued in writing.

Therefore, the Board considers the respondent's request for partial reimbursement of the appeal fee at 25% justified.

8. *Conclusion*

Since the respondent's auxiliary requests are either not admissible or not allowable for lack of inventive step, the Board accedes to the appellant's main

request. The Board accedes to the respondent's request for partial reimbursement of the appeal fee.

Order

For these reasons it is decided that:

1. The impugned decision is set aside.
2. The patent is revoked.
3. 25% of the appeal fee is reimbursed.

The Registrar:

The Chairman:



U. Bultmann

R. Lord

Decision electronically authenticated