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Datasheet for the decision of 12 April 2012

Case Number: T 0392/09 - 3.5.02

Application Number: 97944186.2

Publication Number: 915557

IPC: H02K 9/06, H02K 3/24, H02K 9/22

Language of the proceedings: EN

Title of invention:
AC generator for vehicle

Patentee:
Denso Corporation

Opponent:
Vondrovsky, Gabriel

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56
RPBA Art. 13(3)

Keyword:
"Novelty - no (main request)"
"Inventive step - no (first and second auxiliary requests)"
"Admissibility of late-filed request - no (third auxiliary request)"

Decisions cited:
-

Catchword:
see point 5. of the reasons

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0392/09 **-** 3.5.02

D E C I S I O N
of the Technical Board of Appeal 3.5.02
of 12 April 2012

Appellant: (Opponent)
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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 9 December 2008 concerning maintenance of European patent No. 915557 in amended form.**

Composition of the Board:

Chairman: M. Ruggiu
Members: R. Lord
P. Mühlens

Summary of Facts and Submissions

I. This is an appeal of the opponent against the interlocutory decision of the opposition division concerning the European patent No. 0 915 557 that, account being taken of the amendments made by the patent proprietor in the main request filed with letter of 2 October 2008, the patent and the invention to which it related met the requirements of the EPC.

II. The following documents cited by the appellant are relevant for this decision:

A7: Textbook reference on synchronous machines;
A8: JP 1-27 406 Y2;
A13: Translation of A8 into English filed by appellant; and
A15: JP 3-73 225 B2.

III. With a letter dated 6 September 2009 the respondent filed amended sets of claims of first, second and third auxiliary requests.

Oral proceedings before the board took place on 12 April 2012, during the course of which the respondent requested that the third auxiliary request of 6 September 2009 be replaced by a new third auxiliary request in which claim 1 was replaced by an amended claim 1 filed at the oral proceedings. The board did not admit this request into the proceedings. The respondent raised an objection, referring to Rule 106 EPC, that the decision not to admit this request represented a violation of Article 113 EPC.

The appellant (opponent) requested that the decision under appeal be set aside and that the European patent be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed (main request) or that the patent be maintained in amended form on the basis of the claims of one of the first or second auxiliary requests filed with letter dated 6 September 2009.

IV. Claim 1 of the patent in suit as maintained by the opposition division (i.e. the respondent's main request) reads as follows:

"An alternator (1) for a vehicle including a stator core (40) fixed to a frame (10) on which a three-phase armature winding (50) having portions disposed in slots of said stator core (40), and coil-end portions (54, 55) which extend axially from said slots of said stator core (40) and are composed of a plurality of coil ends (56) is formed, a rotor (30) disposed to face said stator core (40) and means (33, 34), driven by said rotor, for generating cooling air flowing in said frame (10), characterized in that
in a longitudinal cross-sectional view of the alternator (1) said coil-end portions (54, 55) are bulged in radial and axial direction like star clusters so that each one of the coil ends (56) of one phase winding of said three-phase armature winding (50) is spaced apart from another of the same phase winding and also of a different phase winding to form a plurality of cooling air passages between the coil ends (56)."

Claim 1 of the respondent's first auxiliary request differs from that as maintained by the opposition division in that the following definition is added at the end of the claim:

", wherein each size of said spaces in said coil-end portions is between about 1/10 and the same of the diameter of a wire of said armature winding (50)".

Claim 1 of the respondent's second auxiliary request differs from that of the first auxiliary request in that the following text is added at the end of the claim:

", wherein each of said coil-end portions (54, 55) of said armature winding (50) is formed by dividing wires extending from the same slot into two groups respectively directing opposite circumferential directions, wherein
said armature winding (50) comprises double-layered wave-wound windings and wherein
each of layers of said double-layered winding is shifted from each other to reduce the resistance of draft between said layers, thereby increasing the heat dissipation".

V. The arguments of the appellant which are relevant for the present decision can be summarised as follows:

The document A8 disclosed a vehicle alternator according to the pre-characterising portion of claim 1 of the respondent's main request. From figure 7 of that document it was clear that the coil ends were spaced apart in both radial and axial directions so that there

were gaps between them through which cooling air, as depicted by the arrows in figure 2, could flow. The last paragraph of the claim of A8 was not relevant in this context, because it related to the embodiment of figure 5, not that of figure 7. The presence of such gaps was also indicated by figure 4, in which the interrupted lines crossing the coils ends showed that coil ends below could be seen through such gaps, and was confirmed by the text of the final sentence on page 5 and the first sentence on page 6 of the description (in the form of the translation A13). That this arrangement was concerned with the problem of improving cooling was disclosed throughout the document, in particular on page 4. Thus the subject-matter of claim 1 of this request was not new.

The gaps between the coil ends depicted in figure 7 of A8 were clearly larger than the lower limit defined in claim 1 of the respondent's first auxiliary request. Given the known requirements for a vehicle alternator relating to cooling and compactness, the selection of a value for the spacing which was less than the upper limit of that claim would also have been obvious to the skilled person. Therefore the subject-matter of that claim lacked an inventive step.

Claim 1 of the respondent's second auxiliary request included both the spacing range defined in the first auxiliary request and a group of features which effectively defined the type of double-layered wave-wound winding known from A15, as acknowledged in paragraph [0080] of the patent itself. There was no interaction between these two aspects of the claim. That the type of winding was well-known in the

technical field was illustrated by the textbook A7 in the section referring to Figs. 2.1 and 2.2. It would have been obvious to the skilled person that the improved cooling described in A8 would also be achievable in this specific type of winding, so that the subject-matter of claim 1 of this request also did not involve an inventive step. The respondent's arguments concerning a synergetic effect were not relevant, because the cited passage in paragraph [0032] of the published application (paragraph [0033] of the patent specification) did not relate to the embodiment having the defined range of coil end spacing. It was also apparent from the patent that not all of the embodiments had coil end spacing falling in that range, as shown for instance by figure 7, which depicted a significantly larger spacing.

The replacement third auxiliary request filed during the oral proceedings was late-filed and should not be admitted into the proceedings. The respondent had given no reason why it was only filed almost at the end of the oral proceedings, rather than when they became aware of the problem with the previous version of the request. Since the original application was in Japanese, it was not possible for the appellant to compare the proposed text with that of the original application. Moreover, the amendment did not constitute deletion of a technical feature, but instead was the deletion of part of the definition of a feature, which significantly changed the nature of that feature, thereby introducing new issues into the procedure.

VI. The respondent argued essentially as follows:

The last paragraph of the claim of A8 (according to the translation A13) defined that the expanded coil strands form a flat shape, thus excluding radial spreading. Neither figure 5 nor figure 7 of A8 clearly disclosed gaps between the coil ends, and the overall teaching of these two figures in this respect was not clear, because as was indicated by the line A-A in figure 4, the sections depicted in those figures were staggered. From figure 4 it was not clear whether the broken lines indicated that the lower coil-end portions could be seen through gaps, or whether these were merely indications of the position of those coil-end portions which could not be seen. That there were no gaps was consistent with page 4, lines 9 and 19 of the description (in the translation). Thus the subject-matter of claim 1 of the main request was new.

The spacing defined in claim 1 of the first auxiliary request was not obvious because figure 7 of A8 showed some of the coil ends to be in contact with one another.

The subject-matter of claim 1 of the second auxiliary request involved an inventive step because the splitting of the coil-end portions in the double-layered wave-wound winding resulted in more space being available for the gaps for cooling air, thus resulting in a synergetic effect. This was apparent from paragraph [0032] of the application, which applied to all embodiments, as did the specified spacing. Moreover, the combination of documents A8 and A15 was not obvious because they addressed different problems (cooling and simplicity of fabrication respectively).

The replacement third auxiliary request had been filed because, during the preparation for the oral proceedings before the board, the respondent had become aware of a discrepancy between claim 2 of the application as filed on entry into the regional phase (i.e. the claim on which the additional feature of this request was based) and the corresponding claim in the original international application. As such this amendment did not give rise to any objection under Article 123(2) EPC, as was emphasised by the fact that the amendment was consistent with paragraph [0018] of the application as filed on entry into the regional phase. Also the amendment met the requirement of Article 123(3) EPC, because claim 1 was restricted with respect to the granted claim 1. The assessment of novelty and inventive step of the amended claim should present no significant problem, because the amendment consisted only of the deletion of a feature. Furthermore, the replacement request should be admitted into the procedure because the deficiency identified in the previous version of the request was such that the board would in any case have been obliged to investigate it of its own motion in order to ensure that the patent was not maintained in an unallowable form.

Reasons for the Decision

1. The appeal is admissible.

2. *Main Request - Novelty (Article 54 EPC)*

2.1 Claim 1 of the patent as maintained by the opposition division includes the definition that the coil-end portions are "*bulged in radial and axial direction like star clusters*". The appellant has raised objections relating to this definition, either alone or when compared to the corresponding definition in the granted claim ("*spaced apart from one another to form a cluster shape*"), under Articles 83, 84 and 123(2) and (3) EPC. Given the variety of these inter-related objections, and in particular given that the question as to whether the requirements of Article 84 EPC need to be considered (since it could be argued that any lack of clarity in the maintained claim was also present in the granted claim, and so does not arise from the amendments), the board considers it to be both appropriate and expedient to at least initially concentrate on the issues of novelty and inventive step.

2.2 It is not disputed that the document A8 discloses an alternator including all of the technical features of the pre-characterising portion of claim 1 of the patent as maintained by the opposition division.

2.3 In order to assess whether the technical features of the characterising portion of the claim are also present in the alternator disclosed in A8, it is first necessary that the board establish the meaning of that part of the claim. The characterising portion of the maintained claim 1, like that of the granted claim 1, comprises a combination of concrete definitions, in terms of the coil ends, their spacing and the resultant cooling air passages, with the definition by simile

mentioned above (i.e. "*bulged in radial and axial direction like star clusters*"). The board interprets this latter expression, in the context of the remainder of the claim, as adding merely that the spacing apart of the coil ends is such that the envelope of the coil-end portions is expanded in both the radial and axial directions. This interpretation was not disputed by either party.

2.4 Figure 7 of A8 depicts a longitudinal cross-section of the stator of one of the two main embodiments of that document, the section being in fact taken along the staggered planes indicated by the line A-A in figure 4. From figure 7 it is apparent that the coil ends of each of the depicted coil-end portions (1b, 1c) have been moved apart compared to the conventional compact arrangement in both the axial direction (up-down in the figure) and the radial direction (left-right in the figure). The board also considers it to be clear from that figure alone that the coil ends within a phase winding are positioned such that they are completely spaced apart from one another (i.e. not in contact with one another), thus forming cooling air passages between them. That this applies also with respect to the spacing between coil ends of different phase windings is evident from figures 3 and 4. The board therefore concludes that this embodiment of A8 also includes all the technical features of the characterising portion of claim 1 of the patent as maintained by the opposition division.

2.5 The respondent has disputed that it can be derived from the schematic figure 7 that the coil ends are not in contact with one another. The board concludes however

that, even if it could be considered that this is not disclosed unambiguously by this figure, it is nonetheless strongly suggested, and that this suggestion is confirmed by figure 4 and by the description, so that the skilled person would consider from the document as a whole that this feature is unambiguously disclosed. Looking firstly at figure 4, the board notes that it is clear from this figure that parts of the lower coil-end portions can be seen through the gaps between the individual coil ends of the upper coil-end portions. As an example, it seems clear to the board that the interrupted lines crossing the coil-end portions 1a represent the parts of the coil-end portions 1b and 1c which can be seen through those gaps. In this context the boards observes that at least some of the apparent differences of opinion between the parties regarding the disclosure of these figures appear to arise from the different levels of resolution of the printed documents to which they were referring. By consideration of a version with adequate resolution, it also appears to the board that there is no justification for the respondent's allegation that figure 7 shows some of the coil ends to be in contact with one another. Nor can the board see any significance in this respect of the point raised by the respondent that the cross-section depicted in figure 7 is staggered, as shown by the line A-A in figure 4. Moreover, the board takes note of the following passages of the description:

– "*all the surface areas of all the coil units are exposed at maximum such that the respective phase coil units do not block cooling air with each*

other" (from the second paragraph of page 2 of A13); and

– "*the coil strands are shifted in the axial direction from one another such that all the coil strands can be seen without obstruction when viewed from the side of cooling fan*" (from the first paragraph of page 6, which relates specifically to the embodiment of figure 7).

The board is of the opinion that these two passages can only be understood as meaning that the coil ends are not in contact with one another, so that the cooling air can come into contact with their entire surfaces. The board also considers that the definition in the last paragraph of the claim of A8, to which the respondent has referred, is not relevant to the above argumentation, because the skilled person would recognise that the "*flat shape*" defined there relates to the embodiment of figure 5, and not to the alternative embodiment of figure 7.

2.6 Therefore the subject-matter of claim 1 of the respondent's main request is not new with respect to document A8.

3. *First Auxiliary Request - Inventive step (Article 56 EPC)*

3.1 Claim 1 according to the respondent's first auxiliary request defines additionally that the size of the spaces in the coil-end portions is between about one tenth of the wire diameter and the wire diameter. The board notes that this can only reasonably be understood

as relating to just the spacing between nearest neighbours, which interpretation was not disputed by either party. Document A8 contains no explicit teaching concerning this parameter, and the board agrees with the respondent that it is not possible to derive any unambiguous teaching in this respect from the figures of that document, since these are merely schematic. The board concludes therefore that the subject-matter of this claim is new with respect to A8.

3.2 However, the board agrees with the appellant that the selection of a value for this parameter falling within the claimed range would be obvious for the skilled person. Specifically, when implementing the teaching of A8, the skilled person would need to choose a value for this spacing, and would recognise from his common general knowledge relating to vehicle alternators that two conflicting requirements apply. Firstly, he would recognise that the requirement for passage of air between the individual wires (i.e. the primary aim of document A8) suggests that the gaps between the wires should not be too small. Secondly, he would recognise that the known requirement that the alternator should be compact suggests that the spacing should be no larger than is necessary to achieve the cooling requirement. The board considers that, taking into account these two requirements, the skilled person would arrive in a straightforward manner at a spacing falling within the claimed range, whether from purely theoretical considerations or by simple experimentation. Therefore the board concludes that the subject-matter of this claim does not involve an inventive step according to Article 56 EPC.

4. *Second Auxiliary Request - Inventive step (Article 56 EPC)*

4.1 Claim 1 of the respondent's second auxiliary contains, in addition to the features of claim 1 of the first auxiliary request, three paragraphs relating to the form of the windings. The board understands that these paragraphs define that the winding is of the double-layered wave-wound type, as disclosed in the document A15 (i.e. the document referred to in this context in paragraph [0080] of the patent in suit). This interpretation has not been disputed by the parties. Given the conclusion of paragraph 3.2 above, the subject-matter of this claim is also new, since the claim includes all the features of claim 1 of the first auxiliary request.

4.2 The board is of the opinion that the skilled person, working on the basis of the teaching of A8, would recognise that the improvements in cooling described there are not restricted to a particular type of winding, and would therefore consider it obvious to apply that teaching to the known double-layered wave-wound type of vehicle alternator, as described in A15. That this type of winding was well-known to the skilled person is illustrated by the fact that it is also described in the textbook A7 (see Figs. 2.1 and 2.2 of that document). By thus applying the teaching of A8, and by selecting the spacing as described above with respect to the first auxiliary request, the skilled person would arrive in an obvious manner at an alternator according to claim 1 of this request. Therefore the subject-matter of this claim does not involve an inventive step according to Article 56 EPC.

4.3 The board notes that it would also be obvious to the skilled person, starting from a vehicle alternator with a double-layered wave-wound winding, as known from each of A15 and A7, to apply the teaching of A8 in order to improve the cooling of the alternator, and furthermore to select the spacing as in the first auxiliary request. Thus, also for this reason the subject-matter of claim 1 of the second auxiliary request does not involve an inventive step.

4.4 The respondent has argued that the combination of the type of winding with the selected spacing results in a synergetic effect in terms of achieving the desired cooling in a smaller space, as discussed in paragraph [0033] of the patent in suit. The board is however of the opinion that any such effect would be merely a relative improvement in the advantages which the skilled person would expect from such a combination, such that it must be understood as representing merely a bonus effect arising from a development which is in itself obvious. This effect could therefore not form the basis of an inventive step. In this respect the board agrees with the appellant that the effect referred to in paragraph [0033] of the patent can only be understood as relating to the spacing between coil ends as such, and not to the specific range for the spacing defined in the present claim, since it appears from the figures of the patent (e.g. Fig. 7) that not all embodiments of the patent have a spacing falling within this range.

5. *Amended Third Auxiliary Request - Admissibility*

5.1 The respondent requested to replace claim 1 of the third auxiliary request filed with his letter of 6 September 2009 with an amended version of that claim. This request was filed towards the end of the oral proceedings before the board, after the discussion of the main and first and second auxiliary requests, and indeed only after the appellant had presented his arguments concerning the third auxiliary request then on file. The respondent explained that the need for this amendment had only become apparent during the preparation for the oral proceedings, but presented no reasons as to why the request was only presented at this late stage of the oral proceedings.

5.2 The substantive reasoning behind the amendment, as explained by the respondent, was that they had become aware of an inconsistency between claim 2 of the application as filed on entry into the regional phase before the European Patent Office (i.e. the claim on which the added definition of this request was based) and the corresponding claim of the original international (PCT) application, as a result of which it was necessary to delete the words "*are divided into two layers of one of said phase windings to*" from claim 1 of the third auxiliary request. The respondent also noted that this was consistent with paragraph [0018] of the application as filed on entry into the regional phase, which referred to claim 2. The respondent argued furthermore that, since the amendment merely involved deletion of a feature, assessment of compliance with Article 123(2) EPC should not be problematic, and that since the claim included all the

technical features of claim 1 of the patent as granted, there could be no objection under Article 123(3) EPC.

5.3 The board notes, however, that assessment of the compliance of the amendment with Article 123(2) EPC requires a comparison of the present claim with the original international application, which was in Japanese. Since the request was filed only during the oral proceedings before the board, neither the appellant nor the board is in a position to make that comparison without adjournment of the oral proceedings. Given that the respondent has indicated no reason why this request was only filed when it was, and not when they became aware of the problem, the board concludes that for this reason alone it would be appropriate to make use of its discretion under Article 13(3) RPBA not to admit the amended request into the procedure.

5.4 Moreover, the board agrees with the appellant that the amendment in this request, although it consists only of the deletion of a number of words, does not merely represent the deletion of a feature of the alternator. This is the case because the deleted words do not define a technical feature as such, but rather form part of the definition of a technical feature (the arrangement of the coil ends), so that their deletion results in the nature of that technical feature being changed. This change results in significant differences at least with respect to the assessment of novelty and inventive step. Thus the amendment introduces new issues which had not previously been discussed in the procedure. The board considers that this aspect of the amendment in this request also justifies the use of its

discretion under Article 13(3) RPBA not to admit the request into the procedure.

5.5 The respondent has argued that, given the nature of the deficiency addressed by the amendment in this request, it was not merely the case that the request should be admitted, but that it was in fact incumbent on the board to investigate the matter of its own motion. The basis for this argument was that the previous version of the third auxiliary request showed deficiencies, such that it did not meet the requirements of the EPC, so that the board was obliged to take action to prevent the patent being maintained in this form. The board acknowledges that it could be argued that, had the respondent raised the issue at an earlier stage, then the board would have been obliged to pursue the objection. Indeed, this might also have applied to the opposition division, since this deficiency was also present in claim 1 of the third auxiliary request filed in the respondent's letter of 29 July 2002 replying to the statement of opposition. However, the board notes that it does not follow automatically from such considerations that any amendment filed by the respondent in order to address this problem should necessarily be admitted into the procedure. Furthermore, in the present case, the board has to take into account that, although according to the respondent's own submission at the oral proceedings, they became aware of the deficiency during their preparation for the oral proceedings before the board, they did not file the amended third auxiliary request at that time, which might have given the appellant and the board the opportunity to consider the issues discussed in paragraphs 5.3 and 5.4 above, but instead waited until

late in the oral proceedings before raising this issue and filing the amended request. Under these circumstances it appears entirely appropriate to the board that they exercise their discretion under Article 13(3) RPBA in the manner indicated above.

5.6 Therefore the board decided not to admit the replacement third auxiliary request filed during the oral proceedings into the procedure.

6. Given the above conclusions, it is not necessary for the board to return to considering the other objections mentioned in paragraph 2.1 above.

7. Thus, none of those requests of the respondent which have been admitted into the procedure provides a basis for the maintenance of the patent in amended form. Consequently, the patent has to be revoked in accordance with the appellant's request.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

U. Bultmann M. Ruggiu